Coconino County
Comprehensive Plan

Adopted
December 15, 2015

COCONINO
COUNTY ARIZONA

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Coconino County Community Development Department
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PROJECT DEVELOPMENT, PLAN REVIEW, & APPROVALS
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PLAN DESIGN & PUBLICATION
This is a public document developed by staff of the Coconino County Community Development Department and others of the Comprehensive Plan Committee, Science Advisory Group, and Interagency Work Group.

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The maps were produced by the Coconino County GIS Department.

THE PLAN ON THE WEB
Coconino County's Partnership website: http://www.coconino.az.gov/compplan

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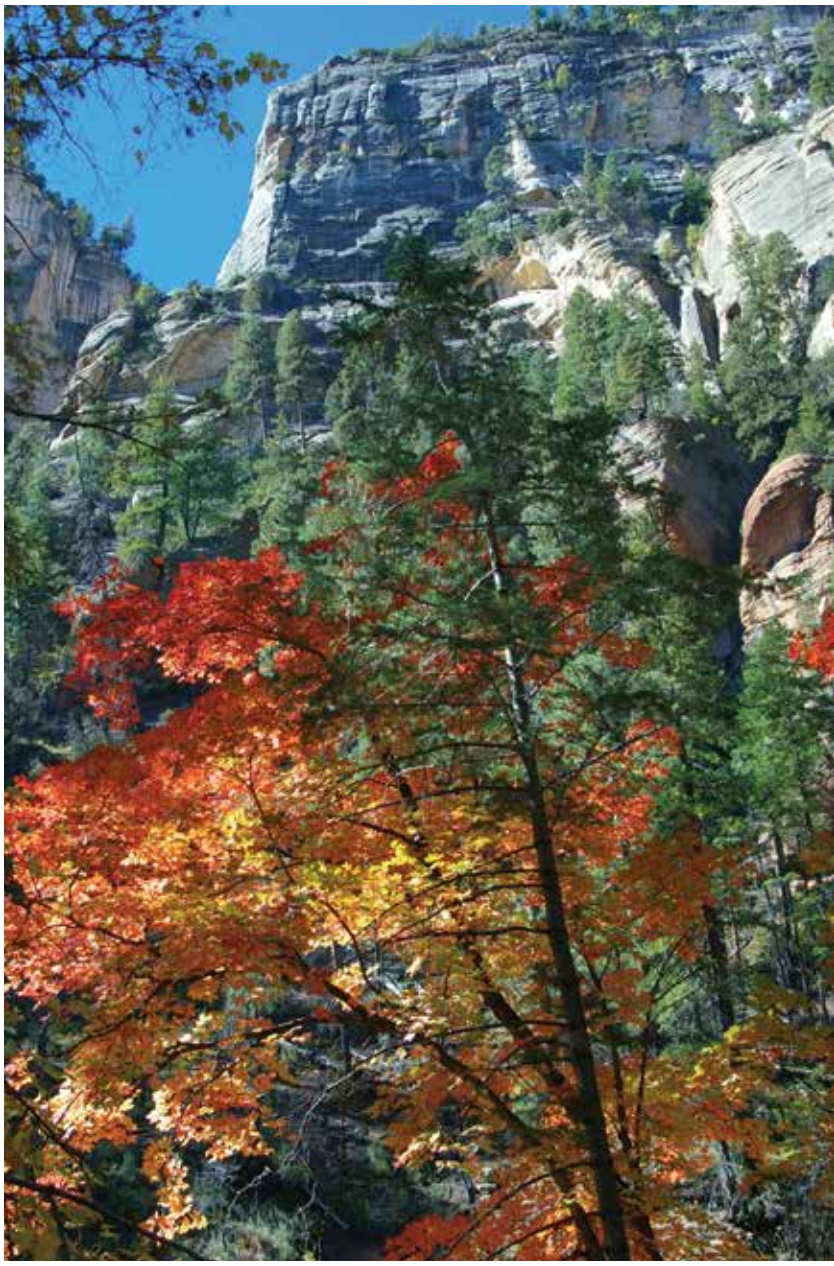

West Fork, Oak Creek.

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COCONINO COUNTY RESIDENTS

A special acknowledgement to the hundreds of interested residents who participated in community open houses, special meetings, public hearings from kick-off on January 2014 through adoption in December 2015.

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Contents

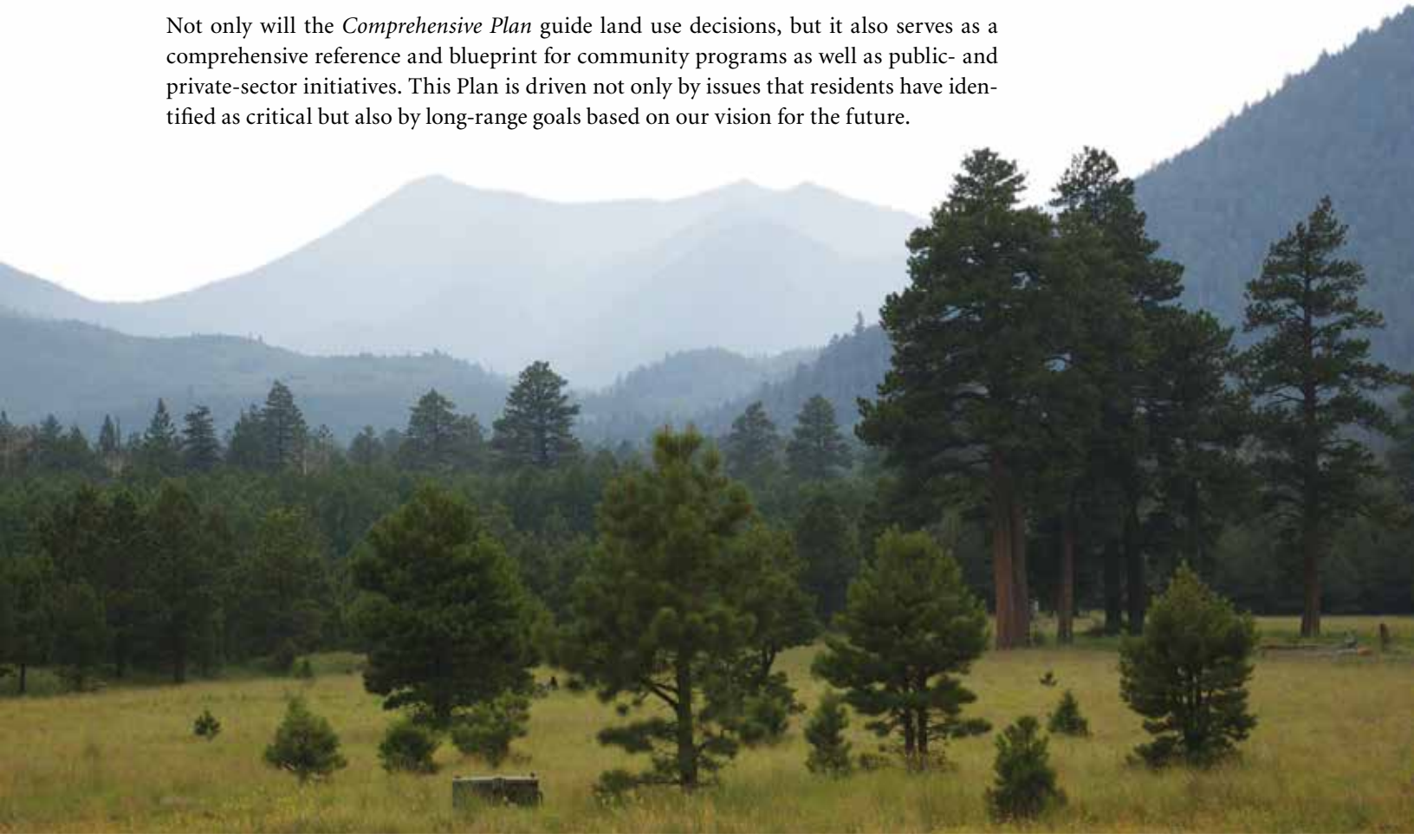
Foreword

One of the most spectacular places on earth, Coconino County is home to the Grand Canyon, Vermilion Cliffs, San Francisco Peaks, and Oak Creek Canyon, among other unique natural features. Each year, it attracts millions of visitors and hundreds of new residents who are drawn to its welcoming communities and open spaces. Residents express widespread satisfaction with Coconino County as a place to live; however, they also want to manage growth and development to ensure that the qualities they value are not lost in the process of accommodating change.

This *Coconino County Comprehensive Plan* serves as a roadmap for the future by establishing goals and policies to direct growth responsibly, solve problems, and improve the quality of life for county residents. The *Comprehensive Plan's* main objectives are to:

- Conserve and promote stable, safe, attractive, rural communities where residents share a sense of pride.
- Safeguard and enhance the choices residents expect for living, working, recreation, and circulation.
- Coordinate strategies for economic development, transportation, and affordable housing so that we can better link the places where people work and live.
- Protect our unique natural and cultural resources, ecosystems, and habitats.

Not only will the *Comprehensive Plan* guide land use decisions, but it also serves as a comprehensive reference and blueprint for community programs as well as public- and private-sector initiatives. This Plan is driven not only by issues that residents have identified as critical but also by long-range goals based on our vision for the future.



Lockett Meadow.

Letter from the Director

December 15, 2015

Dear Residents of Coconino County,

Geoff Barnard

Bill Cordasco

Jim Corning

Patty Garcia

Leo Gishie

Laura Huenneke

Wendell Johnson

David McKee

Jamie Neilsen

Judy Prosser

John Ruggles

Maggie Sacher

Don Walters

As the members of the Comprehensive Planning Committee, we have worked closely with the Community Development Department over the past 2 years to advise staff on the update to the *2003 Comprehensive Plan*. As residents of Coconino County, we represent diverse professional backgrounds including private business, ranching, academia, nonprofit, and public service. In our meetings, we reviewed each chapter and section thoroughly, seeking clarification for ourselves and clarity for future users of the Plan. Our discussions were consistently positive and collegial, where all members were encouraged to contribute their personal perspectives and suggestions. Where there were differences of opinion or disagreement, we sought to find areas of consensus.

Two primary themes have emerged from our discussions of the chapters and coalesce to form our vision for the future of the county. The first is diversity. The current and future strength of Coconino County lies in the diversity of its people, perspectives, environments, and economy. Our vision is that the County fosters this diversity by allowing communities to determine, to the greatest extent possible, what is appropriate for them. It also involves creating, revising, and administering County rules and regulations with the greatest possible efficiency, flexibility, and fairness. The second is sustainability. Inherent in this concept is making decisions today based on a long-term and holistic view: one that builds thriving human communities while caring for our land, plants, wildlife, and water, and the opportunities they represent for the future. As members of the committee, we feel these themes span all the chapters of the *2015 Comprehensive Plan* and create an integrated vision for the future. In the process of updating the plan, the County has reached out to its citizens and experts to identify major opportunities and challenges. In each case, the County has sought its correct role in addressing these challenges either through leadership, coordination, education, outreach, and/or regulation. We believe this Plan honors the diversity of our county and sets goals and policies that encourage sustainable growth while conserving our unique natural environment.

Sincerely,

The Comprehensive Planning Committee

Our Vision for the Future

COMMUNITY VALUES

Coconino County will continue to attract people with its quality of life, rural atmosphere, and natural beauty. Its residents and visitors can access and enjoy an incredible system of parks, forests, monuments, recreation, and wilderness areas. Coconino County remains home to a diverse mix of residents, celebrates a rich array of arts and cultures, and provides a wide range of employment, housing, and lifestyle choices. Residents increasingly benefit from livable wages, economic prosperity, and high-quality health care and educational opportunities. Social connections, which help form our communities, stay inherent in the way we live, work, and play.

GROWTH & DEVELOPMENT

We will accomplish responsible growth by integrating new development in a way that respects the environment, supports community values, and considers the long-term viability of ecosystems and water sources. To help achieve this goal, we will rely on growth areas with planned communities, integrated conservation design, and infill on vacant parcels. The County will offer a variety of incentives to those who use sustainable building techniques, protect environmentally sensitive features, and build in harmony with the land. Residents will be able to choose from a wide range of housing types and expect new development in designated growth areas that follow available and planned infrastructure for utilities and services. We continue to respect property rights and recognize personal responsibility and stewardship of the land, as well as reliance on oneself.

CONSERVATION & ENVIRONMENTAL QUALITY

Value for the beauty of our distinctive natural landscapes, solitude, recreational opportunities, and ecological function remains a priority; as a result, we will work to ensure their long-term health and viability. A thriving system of public and private lands will support diverse native plant and animal communities, healthy riparian areas, grasslands, and forests with excellent air and water quality. To safeguard the county's scarce water resources for future generations, we will conserve and reuse whenever possible. Our public policies continue to support the viability of working ranches, protect environmentally sensitive features and ecosystems, and help conserve our natural resources and rural character.

COMMUNITY PARTNERSHIPS

We will draw upon our strength as a community, embracing our diversity and acknowledging our common goals. Private and public interests will continue working together successfully, recognizing that a cooperative approach is necessary to create strong communities, conserve the environment, and be fiscally responsible. Planning activities across jurisdictions remain successful because of the high degree of coordination. The County will follow sound resource-management practices, facilitated by ongoing engagement with local, state, federal, and tribal agencies during the development of each other's plans and policies. Long-term strategic partnerships will develop to implement plans that enhance and support our shared values.

The Land Ethic

In pursuing the long-term vision for Coconino County's future, everyone—government, businesses, organizations, landowners, residents, and visitors—has an ethical obligation to the land. This land ethic is fundamental to the Native American traditions of northern Arizona and to the North American conservation movement.

> *The mountains—I become part of it*
> *The flowers, the evergreen tree—I become part of it*
> *The morning moisture, the clouds, the bodies of water—I become part of it*
> *The wilderness, the water drops, the pollen—I become part of it*
>
> *Traditional Navajo Chant*

This chant reflects the perspective shared by many of Coconino County's residents that places the natural world in the center of daily life. The Native American traditions of northern Arizona recognize the delicate interconnectedness of all components of nature and stress the importance of caring for the environment and finding personal balance with these forces.

Upper Sycamore Canyon.

> *Whatever may be the equation for men and land, it is improbable that we as yet know all its terms. The answer, if there is any, seems to be in a land ethic, or some other force which assigns more obligation to the private landowner.*
>
> *The land ethic simply enlarges the boundaries of the community to include soils, waters, plants and animals, or collectively: the land. A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land.*
>
> *Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity. It is inconceivable to me that an ethical relation to land can exist without love, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.*
>
> *A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.*
>
> *Aldo Leopold, Sand County Almanac*

These ethics are integral to the *Coconino County Comprehensive Plan*, which is built upon our strength as community and which establishes a solid set of guiding principles that allow us to achieve our vision. Assuming responsibility for the future of our lands is the first step in encouraging the kind of quality growth and development that will ensure the county's long-term value as a place of unsurpassed natural beauty and unique cultural resources.

Living in Coconino County: Code of the West

The Code of the West can be summed up into two words: integrity and self-reliance. This way of life is still defined by working hard to make a living, giving others a fair chance, knowing that some things are not for sale, and cooperating with neighbors in finding solutions to shared problems. It also means a deep love and appreciation of the landscapes and traditions that define living in the rural West. The Coconino County Code of the West is intended to offer an accurate portrait of the conditions in rural Coconino County and to help make the transition to living and doing business here as transparent and pleasant as possible. We do not offer the same level of service that one expects from a municipal government. Services and infrastructure in rural and isolated areas may not be available at all and, when available, they may instead be provided by private companies, homeowner associations, or a special taxing district. While levels of service vary throughout the county, regulations are applicable to all properties under County jurisdiction. Some of the specific conditions that may be encountered in rural areas are described below.

- ***Water and Wastewater:*** The County is not a water provider. Some areas in the county are serviced by private water companies. If your property is located outside of these service areas, you or a commercial provider can haul water or drill a well. The quality and quantity of well water varies considerably from location to location and season to season. Long-term supplies are not assured. Wastewater is also an issue and most properties will require an approved septic system or other treatment process.

- ***Emergency Response:*** Response times in rural areas by law enforcement, fire suppression, and medical emergency service providers can vary significantly and be very expensive. If the property you purchase is not in an established fire district, you could be billed substantial fees for the cost of a response to a fire or medical emergency.

- ***Roads:*** While Coconino County improves and maintains an extensive network of roads, many of the roads in rural areas are privately owned, and owners are responsible for the repair and reconstruction of damaged roads and structures. Prospective property owners should anticipate joining an existing private road association or road improvement district, or forming a new one, or assuming the expense of maintaining and plowing the roads that are owned in common. The existence of a road to your property does not guarantee access in perpetuity unless and until you establish legal access. Emergency service vehicles may be delayed if they encounter problems navigating roads not built to County standards. In extreme weather conditions, roads can become impassable for several days and may further limit emergency response.

- ***Services and Utilities:*** Levels of service and access to utilities vary throughout the county. For example, electric service is not available to all areas of the county and costs to extend power lines can be prohibitive. Many property owners who choose to live "off the grid" use a generator or alternative power sources such as photovoltaic (solar) or wind-powered systems. Power outages are more common in rural areas of the county and loss of electricity can interrupt your well water supply and wastewater system. It is important to be prepared to be without utilities for a week or more in rural areas. Trash removal and recycling may not be available and it is illegal to create your own trash dump or burn trash on your property. If there is not a commercial hauling service in your area, you must transport waste to an established

facility. The availability of communication services varies considerably, from full-service DSL and cable, to cellular service only, to no service at all. Regular mail, newspaper, and/or parcel delivery may not be available or may carry additional costs. You may need to drive your children to the nearest publicly maintained road to catch the school bus.

- ***Natural Hazards:*** The rural areas in Coconino County are desirable places to live, but the proximity to forests and other landscape features offer the potential for wildfires, wildlife encounters, dust, flooding from rain and snowmelt, and limited seasonal access. Wildfires of unprecedented frequency and magnitude are expected to continue and may become more frequent over the coming decades.

- ***Relationship with Neighboring Properties:*** Many county residents keep livestock, poultry, and pets on their land. Living in rural areas means living with the smells and noises inherent in rural life. Arizona is an open-range state, meaning that if you do not want cattle, sheep, or other livestock on your property, it is your responsibility to fence them out. Dark skies are a treasured and protected resource in Coconino County; therefore, you should expect neighborhoods with little or no lighting. There may be existing easements on your property that allow the construction of roads, power lines, water lines, sewer lines, or similar utilities across your land. Easements are private agreements between property owners. Growth may not be so apparent in a county with so much rural property. Land uses, property ownership, and other factors can change. Views can be obstructed by development on neighboring parcels. There is not a guarantee that surrounding publicly held lands will remain undeveloped, as they can be traded or sold for future development.

- ***Land Use Regulations:*** In addition to County zoning and building code regulations, State of Arizona laws can affect the rights you have on your property. For example, you may not own the mineral rights on/under your property, nor should you assume that you have rights to surface water on your property. Most land divisions are completed through lot splits, with minimal oversight from the County regarding access or infrastructure. Verification of your property lines should be obtained by a registered land surveyor. Building and septic permits are required in all unincorporated areas of the county. Not all properties available for sale are legal for development. The County Assessor recognizes many parcels for the purpose of taxation that cannot, for a variety of reasons, be issued a building permit. It is important to conduct due diligence to address these issues before purchasing a property. Additionally, it is important to refer to the County *Zoning Ordinance* for specific information on permitted and conditional land uses.

- ***Commercial / Industrial Use:*** For existing businesses and ones seeking to relocate here, it is important to realize that much of Coconino County remains a rural, undeveloped landscape. While established transportation corridors (interstate, state, and national highways, as well as railroads and airports) exist, new development outside of incorporated areas will likely require the developer to provide roads and utility infrastructure. Additionally, telephone, cell phone, and Internet services may not be available or reliable in some of the more rural areas of the county. Identifying properties in or adjacent to incorporated areas of the county may provide opportunities to reduce infrastructure and other startup costs.

These issues are discussed further throughout the *Comprehensive Plan*.

Guiding Principles

INTRODUCTION

Coconino County features some of the most spectacular ***landscapes*** and diverse environments in the Southwest. Its canyons, mountains, forests, ***woodlands***, wetlands, grasslands, and vast ***open spaces*** support an incredible range of ***ecosystems***. These ecosystems contain all the ***species*** and ***habitats*** in a given area that interact together with the physical environment to form interdependent, natural communities. The species that live here, the habitats they live in, and the complex ***ecological processes*** that guide their interactions have developed over millions of years. They are unique to this area. Sustaining our ecosystems and the processes that maintain them is essential to our wellbeing and particularly important as we face impacts from climate change, including reduced snow pack, more severe weather, and changes to vegetation and habitat. In fact, a significant part of our economic viability ultimately depends on the health of these ecosystems—their flowing ***springs*** and rivers, clean water, dramatic landscapes, and abundant wildlife.

As expressed in "Our Vision for the Future," residents desire thriving communities and viable economies that exist in harmony with our unique natural environment. This Plan integrates conservation-based planning principles to ensure that ***land use*** decisions meet human needs while maintaining the county's ecological integrity. Since we are a part of nature and our actions affect the health and vitality of ecosystems, we are responsible for proper ***stewardship*** of the natural environment. Through conservation-based planning and use of the decision-making principles discussed herein, we can succeed in creating vibrant communities that coexist with healthy, productive, natural ecosystems.

TRADITIONAL TRIBAL PRINCIPLES

For many hundreds of years before the arrival of Europeans to northern Arizona, indigenous people lived and cared for its land and water. Today, Native Americans comprise a significant portion of the county's population, and their perspective on the stewardship of nature is very valuable. According to traditional beliefs, people do not own the land, but rather belong to it, and have the obligation to care for it. The land is alive and nurturing; respectful stewardship is mutually beneficial to both humans and the land. Although this perspective may differ from the way land is owned and used in Coconino County, the traditional principles of stewardship and sustainability align with the guiding principles presented below and applied throughout this *Comprehensive Plan*. Indeed, sustainability—the cornerstone of this Plan—ultimately centers around Seven Generations Principles. In this way, our vision aligns with native perspectives as we strive to make land use decisions that do not compromise the ability of future generations to enjoy the same quality of life we have today.

CONSERVATION-BASED PLANNING

Coconino County has adopted conservation-based planning to fulfill "Our Vision for the Future," which considers long-term sustainability. Conservation-based planning also supports our desire for quality neighborhoods where residents can live, work, play, gather, and enjoy our unique landscape and open spaces. By looking beyond the boundaries of a single parcel, conservation-based planning can unite a community with a system of ***greenways***, trails, and protected natural lands. It can also help ensure that ecologically sensitive areas such as ***wetlands*** and ***floodplains*** remain connected to adjacent ***riparian areas*** and stream corridors. This approach not only offers recreational opportunities and neighborhood amenities but also maintains quality habitats and ***wildlife corridors.***

THE SEVENTH GENERATION PRINCIPLE AND SUSTAINABILITY

The Seventh Generation Principle is an indigenous perspective that is woven into the concept of sustainable development, which seeks to meet "the needs and aspirations of the present generation without compromising the ability of future generations to meet their needs".

The greatest ultimate benefactor of conservation-based planning is the public. Not only will they will benefit from added open space and amenities, but their tax dollars will also be spent more wisely because the costs associated with long-term infrastructure maintenance, ecosystem services, and ***mitigation*** measures will be substantially reduced. Likewise, maintaining natural vegetation and topography can minimize flooding and ***erosion***, filter pollutants from stormwater ***runoff***, and allow runoff to ***percolate*** into the soil and replenish underlying ***groundwater*** supplies.

Overwhelmingly, residents are attracted to Coconino County because of its unique natural environment. Changes to our surroundings need not destroy ***habitat connectivity*** or natural communities. Conservation-based planning seeks to protect, improve, and restore the ecosystems that we share.

ECOLOGICAL FRAMEWORK

Biological diversity (or "biodiversity") is the cornerstone of healthy, vibrant ecosystems that have the ability to recover from disturbances. Ecosystems respond to land use decisions and climate fluctuations, which profoundly affect fire cycles, temperatures, and precipitation patterns and amounts. Changes to an ecosystem can reach a critical point where they cause dramatic reductions in species populations or shifts from one biological community to another over very short periods. Abrupt declines in populations may be difficult to predict because problems may not be evident until a key ***threshold*** is reached or exceeded. Threshold responses can be caused by human-triggered events such as ***pollution***, ***habitat fragmentation***, ***development***, and overuse of land and water resources. Exercising caution in land use decisions is important because approaching thresholds are not always apparent, nor are their triggers.

Given the natural setting of the county and the value residents place on ecosystem health, it was determined that the eleven decision-making principles outlined by the Ecological Society of America[1] were the appropriate foundation for the goals and policies of this Plan. These principles are grounded in the science of ecology, which describes how ecosystems function and thrive across time.

DECISION-MAKING PRINCIPLES

The following principles, applied through the broader lens of land use planning, form the basis of the goals and policies in each chapter of this *Comprehensive Plan*. The County's role in implementing the Plan involves applying these principles when evaluating the anticipated impacts of proposed developments. While each site and situation requires a unique planning approach, these principles offer a predictable, systematic means of enhancing our environment (both natural and built) and avoiding, minimizing, or mitigating the negative impacts of development. These principles are especially useful to County planners when conducting preliminary assessments for proposed projects.

- ***Assess the impacts of local decisions in a landscape context***. Although land use planning occurs at the landscape level, decisions are often made at the site level. However, because ecosystems and habitats are dynamic and interactive, land use changes often have effects beyond the boundaries of a site. Using the best available scientific information in making land use decisions will help ensure that the cumulative effects of human use do not compromise the landscape.

[1] Dale, V.H., S. Brown, R.A. Haeuber, N.T. Hobbs, N. Huntly, R.J. Naiman, W.E. Riebsame, M.G. Turner, and T.J. Valone. 1999. Ecological Principles and Guidelines for Managing the Use of Land. Ecological Society of America Committee on Land Use

- ***Make land use decisions that are compatible with the natural potential of the site and the landscape***. Land uses should consider the physical, biological, cultural, aesthetic, and economic constraints of the site and landscape. Uses that are compatible with the site's "natural potential"—its water, vegetation, and soil resources, for example—are usually cost-effective in the long term. Incompatible uses, on the other hand, often destroy habitat or degrade resources, ultimately resulting in higher costs. An example of a common but incompatible use is supplementing the natural resources of an area by adding nutrients through fertilization or water via irrigation.

EcoRanch, Fort Valley.

- ***Avoid or mitigate for the effects of human use and development on ecological processes and the landscape***. We can avoid, minimize, or mitigate the negative impacts of development by applying good planning and design principles at the appropriate scale. At a local scale, siting a structure without considering ecological processes may disrupt wildlife movement corridors or destroy a particular habitat. More regional impacts include changes to watershed processes caused by altering drainage patterns as part of a development project.

- ***Identify and preserve rare or critical ecosystems, habitats, and associated species***. Rare or critical ecosystems support environmentally sensitive habitats and ecological processes that are key to the overall health and biological diversity of these ecosystems. To understand the factors that affect them, we must inventory critical components, including vegetation and soil types, landforms, wildlife, and hydrologic and geologic features, among others. This information is required to make science-based land use decisions.

- ***Minimize the fragmentation of large contiguous areas of habitat and maintain or restore connectivity among habitats***. Many ecosystem processes require large areas of unfragmented habitat. If this habitat is fragmented into smaller pieces or disconnected from the larger landscape, it can become threatened, jeopardizing the survival of species. Because some species require different habitats during different seasons, maintaining connectivity is important between different habitat types. In addition, because land management and political boundaries do not define habitats and ecosystems, coordination between planners and resource managers is critical.

- ***Minimize the introduction and spread of non-native species and use native plant species in restoration and landscaping***. Non-native organisms often have negative effects on native species as well as on the structure and functioning of ecological systems. The cost of preventing their introduction and spread can be far less than the cost of restoring the long-term damage they can cause to aquatic and terrestrial ecosystems. Likewise, it can also be less than the cost of controlling non-native species after they become established.

- ***Conserve the use of nonrenewable and critical resources***. To preserve the long-term health of our communities and economies, it is important to conserve critically important resources such as water and reduce our reliance on nonrenewable resources such as oil and gas.

- ***Avoid land uses that deplete natural resources***. Reducing or depleting resources such as water, soil, wildlife, or natural vegetation alters ecosystems in significant and fundamental ways. Depleting these resources disrupts natural processes in ways that are often irreversible.

- ***Avoid polluting our communities and environment***. Vibrant communities and ecosystems are either free of pollutants or they contain them at levels that are too low to disrupt natural processes. Land use decisions should limit the levels of pollution entering our landscapes.

Consider land use decisions over time horizons that encapsulate the natural variability of ecosystems. Because the factors affecting ecosystems vary, planning must consider the extreme and catastrophic events that occur over long periods. In the case of climate, such events would include floods, drought, and exceptionally high or low temperatures. For example, drought and flood cycles can differ in magnitude and time scale: El Niño/La Niña cycles occur every 7 to 10 years, Pacific Decadal Oscillations occur every 30 to 50 years, tropical storms occur very erratically and infrequently, and long-term climate changes occur over hundreds to thousands of years. The recent return to drier conditions illustrates the importance of not overcommitting an important natural resource (such as water) that all organisms need to survive.

- ***Evaluate the effects of land use decisions cumulatively and over time***. Long-term changes caused by land use decisions can be delayed and cumulative. Impacts may not be apparent for years or decades; in some cases, we may not recognize them until they reach a threshold when impacts are dramatic. A series of seemingly innocuous, site-specific changes in land use can combine to produce cumulative effects that we cannot attribute to a single, landscape-scale event.

PRECAUTIONARY PRINCIPLE

Although it is useful, scientific knowledge does not always provide clear, certain, and timely answers to important questions about potential environmental impacts. The precautionary principle[2] recognizes that our understanding of ecosystems is complicated by many factors. When certain activity threatens human health or the environment, precautionary measures should be taken regardless of whether all cause-and-effect relationships are fully established. In some instances, we must simply make a "no regrets" decision. In doing so, our decisions should be based not only on the best available scientific information, but also on sound professional judgment and open discussion of both the long-term advantages and consequences.

Ultimately, we need a decision-making framework that minimizes risks to people and the environment. Likewise, we can also benefit from a conservation-based planning process. Although science cannot always provide definitive answers to land use and development decisions, we can and should commit to good planning, collaboration, and foresight. The ***integrated conservation design*** methods described in the "Land Use & Growth" chapter of this Comprehensive Plan offer us an important set of tools for creating quality developments as the county continues to grow.

[2] Environmental Research Foundation, 1998

Oak Creek.

OVERVIEW

Planning allows us to make conscious, informed choices about our future. Since 1973, counties in Arizona have been required to develop plans that address land use, circulation, housing, public services and facilities, conservation, rehabilitation, and redevelopment. The county's population determines the specific requirements that must be included in a comprehensive plan. In 1998 and subsequently in 2000, the State Legislature passed *Growing Smarter* and *Growing Smarter Plus* legislation that enhanced land use planning statutes and expanded requirements.

The *2015 Coconino County Comprehensive Plan* is an update to the *2003 Coconino County Comprehensive Plan*. It includes the addition of the two new chapters: "Economic Development" and "Sustainability & Resiliency." These chapters were added at the request of the Board of Supervisors to better address long-term quality of life and livability for residents. Like the previous Plan, the *2015 Comprehensive Plan* is founded upon conservation-based planning and the ecological principles; however, it specifically articulates these as ***guiding principles*** for the ***goals*** and ***policies*** that ultimately provide the direction for positive, managed growth.

The adoption of this *2015 Comprehensive Plan* signifies that all land use decisions must be consistent with the plan's goals and policies. This is not a regulatory document and does not grant entitlements; it is, however, a plan for future growth and is intended to guide the ***Planning & Zoning Commission (P&Z)*** and the ***Board of Supervisors (BOS)*** when making decisions in the pursuit of coordinated, appropriate, and harmonious development in the unincorporated area of Coconino County. Likewise, it helps residents and landowners determine how to achieve their interests in a way that is consistent with these goals and policies.

An important goal of this *Comprehensive Plan* is to give developers and landowners a higher level of predictability by directing growth and land use patterns and calling for changes to the *Zoning* and *Subdivisions Ordinances*. This benefits them by providing the information they need to proactively address issues that could otherwise be time-consuming and costly to resolve.

DIFFERENCES FROM PREVIOUS PLANS

Like its 2003 predecessor, this Plan integrates conservation from the outset and addresses ways to protect our natural landscapes from the adverse effects of unmanaged development. However, it broadens the means of such protection by encouraging greater

awareness of resources, building healthy communities, and providing specific goals and policies. Conventional zoning practices have focused exclusively on the separation of land uses, prohibiting more creative development patterns. This Plan encourages flexibility to mix different but compatible land uses. It outlines how and where the county should grow and develop in the future. It recognizes private, public, state, and tribal lands in the mix of landownership and the important role they play in the environmental health and overall quality of life for residents. It also recognizes the importance of coordination and cooperation with tribal nations and large ranching entities to ensure mutual and harmonious outcomes. This Plan strives to create robust and healthy communities, both physically and fiscally, by encouraging focused and strategic growth in and around existing communities or with well-planned new development. By doing this, we can more appropriately conserve ecosystems and wildlife corridors, promote sustainability and integrated conservation design, preserve the quality of the rural lifestyle, and improve or expand the infrastructure needed to create a strong, diverse economy in a cost-effective manner.

DEVELOPMENT OF THIS PLAN

This Plan was updated using the same process as the 2003 Plan. This 18-month process represented a collaborative effort between the Coconino County Community Development Department, a citizen's Comprehensive Plan Committee (CPC), an Interagency Workgroup, technical experts, a Science Advisory Group (SAG), and the public. The BOS appointed the 15-member CPC, who represented diverse perspectives and met monthly to discuss, review, and make recommendations on all sections of the Plan. In addition, a management team met weekly to set the agenda and prepare materials for the CPC and the public.

The Interagency Workgroup, which comprised representatives from state and federal land management agencies, was consulted to ensure that the *Comprehensive Plan* would complement and support related land use plans. In addition, the SAG, made up of experts from various technical fields, was consulted to ensure that the Plan's goals and policies were consistent with its overarching conservation objectives. This group's input assures both the CPC and the public that the *Comprehensive Plan* is based on the best available scientific information. We also worked with collaborators from a variety of fields, including housing, economic development, public health, and transportation.

County residents played an important role in updating this Plan. We held over two dozen open houses where the public was encouraged to review the entire Plan and provide feedback. These community members, agencies, organizations, and individuals brought a wide range of perspectives to the planning process.

SCOPE & LIMITATIONS OF THIS PLAN

Although "Our Vision for the Future" extends to the next two decades and beyond, the goals and policies of this Plan are intended to serve for 10 years. The Plan covers all areas of the county, although the County's jurisdiction over land use only applies to unincorporated, privately held (***fee-simple***) land. This said, however, the policies in this *Comprehensive Plan* support the collaborative efforts needed to protect the integrity of all lands.

Although these policies direct the future development of private land, they do not change existing zone classifications, overlay districts, or ***area plans*** for private property owned at the time of the effective date of this Plan. Zone changes and conditional use permits must be consistent not only with the goals and policies of this Plan but also with those of

applicable ***area plans***, ***Rural Planning Areas***, and the ***Flagstaff Regional Plan 2030***. This Plan does not change existing entitlements. Although it does not always encourage development, it recognizes that owners are entitled to development rights in accordance with existing zoning.

INTERFACING WITH OTHER PLANS

This *Comprehensive Plan is the long-range policy document that serves as the "blueprint" for growth, development, and conservation in Coconino County. Planning for the future occurs simultaneously at the regional, county, and local levels. Agencies such as the* ***Arizona State Land Department (ASLD)***, ***U.S. Forest Service (USFS)***, ***Bureau of Land Management (BLM)***, and ***National Park Service (NPS)*** develop plans for managing their lands. For example, ASLD coordinates with jurisdictions on general and comprehensive planning efforts. The BLM's Arizona Strip Field Office is currently working on a plan for travel management, and the USFS is revising the *Forest Plan for Coconino National Forest* and the revised *Forest Plan for the Kaibab National Forest* was approved in 2014. The adopted general plans for the incorporated cities and towns as well as the land use plans adopted by tribal governments and communities should be referred to for specific direction within their respective jurisdictional boundaries.

The *Flagstaff Regional Plan 2030* serves as the general plan for the City of Flagstaff and applies to about 460 square miles surrounding the city. This boundary coincides with that of the ***Flagstaff Metropolitan Planning Organization (FMPO)***. Like this *2015 Comprehensive Plan, the Flagstaff Regional Plan 2030* contains goals and policies to guide growth. Its themes of concentrating development and protecting open space are consistent with those of this plan. The BOS adopted the *Regional Plan* in 2013.

The BOS has adopted nine area plans and one Rural Planning Area plan in Coconino County. As official amendments to the *Comprehensive Plan*, compliance with goals, policies, and design requirements in the area plans hold equal weight to this Plan's goals and policies. Area plans are created and vetted through a public process; as such, they reflect the local residents' vision for future development and focus on the area's unique characteristics and concerns. The area plans and Rural Planning Area plans listed below are being readopted and incorporated into this *2015 Comprehensive Plan* by reference:

- *Doney Park / Timberline / Fernwood Area Plan* (adopted 2001)
- *Fort Valley Highway 180 Corridor Area Plan* (adopted 2011)
- *Kachina Village Area Plan* (adopted 2009)
- *Mountainaire Area Plan* (adopted 1991)
- *Bellemont Area Plan* (adopted 1985)
- *Parks Area Plan* (adopted 2001)
- *Valle Area Plan* (adopted 1999)
- *Red Lake Area Plan* (adopted 1992)
- *Oak Creek Canyon Area Plan* (adopted 1989)
- *Diablo Canyon Rural Planning Area Designation* (adopted 2005)

USING THIS PLAN

The *Comprehensive Plan* guides County regulations and directs the provision of infrastructure and services. In the course of making recommendations and decisions, the Planning & Zoning Commission and the BOS consider the Plan's vision and apply its goals and policies before approving specific projects. The Commission and Board may also choose to impose certain conditions for project approval to further reflect and implement these goals and policies. Additionally, County departments use the Plan to provide guidance in developing annual work programs and budgets. We also use the *Comprehensive Plan* to guide decisions about expanding major infrastructure such as roadways or investing in government buildings, parks, and other facilities.

IMPLEMENTATION OF THIS PLAN

The ***Zoning Ordinance*** and ***Subdivision Ordinance*** are the primary tools for implementing the *Comprehensive Plan*. Both ordinances provide for orderly growth, environmental protection, and adequate facilities and services. Both also specify that the approval of a zone change, subdivision, or conditional use permit depends on consistency with the *Comprehensive Plan* and the applicable area plan. The ordinances contain detailed development standards for implementing the goals and policies of this *Comprehensive Plan*; they provide predictability for development while ensuring compliance.

The "Implementation Plan" chapter identifies specific ***action items***. Implementation will require collaboration between departments within Coconino County as well as other jurisdictions and agencies. The Implementation Plan will be reviewed periodically to track the County's progress and to establish and prioritize action items.

FUTURE AMENDMENTS

This *Comprehensive Plan* is intended to be a "living" document that must be periodically updated to reflect changing regional and community needs and to incorporate new adopted plans and studies by various agencies. As such, the Plan will be reviewed periodically to ensure its consistency with the overall vision for Coconino County and to track progress on the implementation of its goals and policies. It will also undergo a more thorough review and update or re-adoption at least once every 10 years in accordance with statutory requirements. These reviews provide opportunities to assess changes in the county, update background data, and adjust implementation priorities as needed.

Requests for amendments may be submitted by individuals or initiated by the County. Amendments will be reviewed to determine their general consistency with all of the Plan elements. There are three types of amendments to this plan: major, minor, and administrative. Although the ***Arizona Revised Statutes*** specify requirements for reviewing the proposed amendments, they leave the definition of "major" to the discretion of each jurisdiction.

Major Amendments

Major amendments shall be heard once per calendar year and shall be considered by the Planning & Zoning Commission at its regular meeting in October. The application deadline for a major amendment to the *Comprehensive Plan* shall be May 1 of each year. Major amendments are subject to a 4:5 vote of the BOS and require outreach to all internal and adjacent jurisdictions. They are also are subject to referendum. Coconino County defines an amendment as "major" if it meets any of the following criteria:

- Changes to the text conflict with or alter one or more of the goals and policies in this Plan.
- The proposal represents a substantial alteration to the county's land use mixture and balance.
- It adds a new element or substantially changes one or more chapters of the *Comprehensive Plan* prior to the required full 10-year update.
- It adds a new area plan or a new Rural Planning Area.
- It establishes a land use map, growth boundary, or activity center under County jurisdiction.

Minor Amendments

Minor amendments can be considered at any time of the year and are subject to a simple majority vote of the BOS. The following constitute a minor amendment:

- Revisions or updates to an existing area plan or Rural Planning Area that meet the *Comprehensive Plan*'s vision, goals, and policies
- Changes mandated by any new state laws
- Text changes and corrections that do not compromise the intent or impact the substantive mixture and balance of the Plan
- Corrections to planning errors or a planning oversight
- A change to a map, location-based policy, or other specific policy within an area plan
- Any other changes that do not fall under the major amendment criteria listed above and are not administrative amendments

Administrative Amendments

Administrative amendments are minor corrections made under the authorization of the Planning Director to keep the plan as current as possible, such as the following:

- Updates to formatting, typos, URLs, references to other reports or studies that may be amended, and similar edits
- Corrections to scrivener's errors that occurred in mapping or in text and did not reflect the Board action on a property or policy

APPROVAL CRITERIA

Both major and minor amendments must meet the following approval **criteria:**

- The amendment constitutes an overall improvement to the county.
- The amendment will not adversely impact a portion of the county or the existing character (visual, physical, environmental, and functional) of the immediate area.
- The amendment is supported by "Our Vision for the Future" and other goals and policies of the Plan.
- The requested change benefits the county or a specific community.
- Conditions have changed substantially since the last update; such conditions may involve surrounding land uses.

- The subject property or concept was misinterpreted or overlooked in the Plan.
- The amendment will effectively help implement the Plan's other goals or vision.
- The identified site is appropriate for the proposed use.

By reference, this plan honors the *Flagstaff Regional Plan 2030*. Amendments to the *Regional Plan* shall follow the process outlined in that document and are subject to review by the Planning & Zoning Commission and approval by the BOS. Amending the *Regional Plan* therefore brings compliance with this *Comprehensive Plan and does not require the amendment of both documents.*

Minor amendments and rezoning cases can be reviewed together and heard sequentially at the same hearing. Major amendments and rezoning cases can be reviewed together; however, the rezoning case will not be heard by the Planning & Zoning Commission until the referendum period is complete.

The party requesting the amendment must prove that the change constitutes an improvement to the Comprehensive Plan and that it meets the Plan's vision and applicable goals and policies. Likewise, rezoning and subdivisions should be compatible with the intended future land use pattern in the Plan and be consistent with its vision, goals, and policies. Therefore, conformance with the *Comprehensive Plan* does not require that the County approve all development projects in areas where development is premature.

Marble Canyon.

Above: County Solar Project at Sherriff's Office. COCONINO COUNTY FACILITIES MANAGEMENT
Left: Ponderosa High School. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM
Right: Highlands Fire Station. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

Sustainability & Resiliency

INTRODUCTION

Global issues like population growth, fluctuating financial markets, decreased natural resources, and climate change have tremendous impacts on Coconino County and its residents. The County is addressing these emerging challenges by incorporating strategies that minimize harm and support long-term vitality within natural, social, and economic systems. ***Sustainability*** requires living and thriving in a way that does not compromise future generations' ability to also live and thrive. ***Resiliency*** is the ability to respond positively to challenging conditions, most notably to a changing climate and economy. In Coconino County, these concepts guide a comprehensive planning approach that supports diversity across communities rather than a "one size fits all" approach. Large areas of the county are rural, natural, open, and disconnected from urban life; conserving these areas supports the goals of this *Comprehensive Plan*. Conversely, the goals for higher-density areas include principles of compact and complete communities, where people can live, work, shop, and play with minimal transportation and connect to alternative transportation options and the ***Flagstaff Urban Trail System (FUTS)***.

Jones-Glotfelty shipping container house. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

Many of the County's existing policies as well as those included within this *Comprehensive Plan* support the reduction of waste, energy, water, and emissions, as well as the preservation of open space, recreation areas, ***environmentally sensitive lands***, cultural areas, and historic areas. County programs and strategic planning also support community enhancement through education, civic engagement, economic development, ***infill*** and redevelopment, safety, and connectivity. This chapter builds upon these objectives by acknowledging that healthy ***ecosystems*** have social and economic benefits. Its goals and policies offer guidance in supporting resource protection, growth, economic development, and community character outcomes that are shaped as much as possible by the Seven Generations Principle. This principle originated from *The Constitution of the Iroquois Nations – The Great Binding Law*, in which it is written:

> *"Look and listen for the welfare of the whole people and have always in view not only the present but also the coming generations, even those whose faces are yet beneath the surface of the ground—the unborn of the future Nation."*
>
> *Iroquois Nations – The Great Binding Law*

This chapter sets a clear direction for long-term and holistic decision-making in development and land use planning. By including sustainability and resiliency in the *Comprehensive Plan*, the County and its residents can strategically plan and proactively address and adapt to changing environments and systems. Specifically, planning efforts will direct the County's regulatory framework to encourage outcomes that pursue sustainability and resiliency.

COCONINO COUNTY IN ACTION

Comprehensive planning for a sustainable and resilient Coconino County requires understanding its current and future demands for water and energy, along with the impacts of waste and emissions. It also requires identifying ways to mitigate negative impacts and adapt to changing conditions within the environment, economy, and society. Coconino County can—and has—worked to change limiting and outdated regulations to reflect the importance that its citizens place on sustainable living. Voters have long supported measures to restrict mining, improve watershed and riparian health, and protect the county and its residents from disasters such as fire and flooding.

Sustainable Building Program. In April 2003, Coconino County adopted the Coconino County Sustainable Building Program (CCSBP) to encourage, support, educate, and develop sustainable building practices for its citizens. The CCSBP includes a sustainable development checklist, a free certification program for green builders, education on alternative building techniques, and specific technical guidelines for local owners and builders. Many sustainable building technologies require new codes, standards, and processes that, once adopted, will expedite the efficient use of resources. Since its adoption, the CCSBP has grown with great success, certifying over 120 sustainable building projects; providing consultation, education, and resources to several thousand community members; and aiding in the adoption of many codes and standards to incorporate sustainable development.

In recognition for the CCSBP's role as a model and resource for other jurisdictions, Arizona Forward awarded us the Crescordia, the top award for environmental ***stewardship****, in 2014.*

***International Energy Conservation Code**. In 2007, the County adopted the 2006 International Energy Conservation Code (IECC), setting minimum energy-efficiency standards for construction. In 2014, it further committed to energy conservation by adopting the 2012 IECC.*

***Internal sustainability measures**.* In 2008, we adopted sustainable building standards for new County facilities as part of the *Facilities Master Plan* and began to retrofit them for energy and water efficiency. In 2012, we adopted an internal Sustainability Program to facilitate continued prosperity and resilience to the impacts associated with climate change, decreasing natural resources, increased emissions and waste, and the rising costs of utilities. This program works collaboratively with internal departments and external partners to improve efficiencies and sustainability efforts through operations, services, and infrastructure.

Stormwater Management Ordinance**.* In 2014, the County adopted the *Stormwater Management Ordinance* to comply with ***U.S. Environmental Protection Agency (EPA) regulations and goals for stormwater quality.

***Solar photovoltaics**.* Also in 2014–2015, we began installing solar photovoltaics on our own buildings. Because of this measure, the County now secures a third of its electricity from renewable energy resources—and will save a projected $2.3 million dollars over a 25-year time frame.

> *"Sustainability is the practice of living off of our interest and not our principle."*
> *—Bill Cordasco, President of Babbitt Ranches*

THE THREE PILLARS OF SUSTAINABILITY: ENVIRONMENT, ECONOMY, & SOCIETY

The basic tenet of environmental sustainability is that we live in an interconnected world with finite resources. The way we choose to use those resources today will impact the ability of future generations everywhere to use them. Economic growth is often synonymous with ever-increasing development, population growth, and consumption of resources such as water and energy. Living sustainably requires us to recognize when our consumption will degrade resources irreparably. Economic and social sustainability depend on environmental sustainability but require additional conditions such as economic diversification, rule of law, and social equity. Creating a sustainable Coconino County means making hard decisions in the present—decisions that recognize the interconnectedness and interdependency of the three pillars of sustainability.

Environmental Pillar

The environmental pillar addresses ecological function and resiliency, overall ecosystem health, air and water quality, the availability and quality of open space, and the impacts of climate change. It recognizes that social and economic capital are inherently tied to the health of the environment. When making land use decisions, it is critical to evaluate the impacts on natural systems for long-term prosperity for the county and its residents.

Ecosystem Services: ***Ecosystem services*** refer to the numerous benefits provided to humans by the natural environment. These services range from providing clean water and air to regulating climate to bird watching. For example, a healthy ***riparian area*** filters out pollutants before they reach a waterway—a much less expensive and more environmentally responsible alternative to engineering. The County can help support

these ecosystem services by encouraging the use of ***integrated conservation design*** when making land use and development decisions.

Air Quality: Our high air quality is a source of pride for residents. Excellent air quality contributes to human health, outdoor recreation, darks skies, tourism, and community character. Recognizing the impacts of air pollution on our environmental, economic, and community health is important in making decisions about land use and transportation.

Rain water harvesting. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

Water Quantity & Quality: In this dry environment, water is a critical resource for both humans and the ecosystem. Most of the domestic water in Coconino County comes from deep ***groundwater*** wells that are replenished—or recharged—at very slow rates from precipitation events. Our handful of perennial rivers and springs is vital to maintaining wildlife populations and biodiversity. To ensure resilient communities and ecosystems, we must strive to use water at or below natural recharge rates. This is especially true in the face of climate change and the current drying trend in the region. A comprehensive water resources plan that includes conservation and reuse is needed to address the risk of unsustainable pumping in the years to come. Healthy forests and ***rangelands*** are also vital to ***watersheds*** and maintaining property values and riparian health. We must work to bring forests back to natural stand densities that support low-intensity fires to protect our water quality.

The County can continue to promote water conservation and alternative water sources in a variety of ways. Educating the public, developers, and County staff is important. We already help incorporate conservation elements into development projects and encourage the use of reclaimed water, gray water, and rainwater harvesting systems. Currently, the County offers free consultation and resources for implementing water conservation in new and existing development through the Sustainable Building Program; we also support gray water reuse through the Environmental Quality Division of the Community Development Department. The *2001 Landscape Ordinance* is based on xeriscape principles that require new, nonresidential development to use native and/or drought-tolerant plants. We also promote water awareness and conservation through regional partnerships and programs such as the Coconino Plateau Water Advisory Council's Public Outreach Program. New technologies are constantly emerging that can help us reduce our consumption of water.

Open Space: ***Open space*** and ranchlands are critical to the character, quality of life, and economy of northern Arizona because they support ecosystem services, watershed health, recreation, and tourism. It is important to promote the preservation of functional wildlife corridors as well as open lands. Promoting infill, brownfields redevelopment, and concentrated growth can not only help maintain the large tracts of open space and migration routes within the County but also minimize the negative impacts of new development.

Climate Change: Climate change is an overarching threat that communities and governments are trying to forecast and plan for accordingly. Within Coconino County, projections show that the potential outcomes of climate change include drought, wildfire, floods, increased temperatures, and loss of ***habitat*** and healthy ecosystems. One way we can improve ecosystem resiliency in the face of climate change is to reduce the stress we place on natural resources. This can be achieved through projects such as the Four Forests Initiative (4FRI), which is working to restore forest health through thinning and better management practices. Another example is ranchers adjusting grazing pressure according to forage condition. The County, land managers, and private landowners alike must be willing to adapt their practices to account for the stresses imposed by climate change.

Solid Waste: ***Solid waste*** reduction is also a major component of sustainability. By reducing solid waste, we can minimize natural resource production and consumption and reduce the environmental impacts of items entering landfills. For example, a plastic bottle can be recycled into composite wood for decking material, or paper can be recycled into cellulose insulation. A concept behind solid-waste reduction is termed "cradle to cradle." Recycling, although better than sending items into the waste stream, still has environmental impacts; consequently, it is best to reduce materials to the extent possible or, as a second option, to reuse them.

Redevelopment: ***Adaptive reuse*** and ***brownfields*** represent opportunities to use previously developed lands. Adaptive reuse, the process of adapting old buildings for new purposes, can save resources by reusing existing structures. Brownfield remediation can have positive impacts on communities; it represents an opportunity to use previously developed lands that may have environmental contamination. The redevelopment of the many brownfields throughout Coconino County can address environmental and health concerns while concentrating development in activity centers. Coconino County supports the remediation and redevelopment of brownfields, along with infilling and adaptive reuse, to promote more sustainable, compact communities.

Coconino County is a member of the Route 66 Coalition, which received a community-wide assessment grant for brownfields property from the Environmental Protection Agency for $700,000 in October 2012. The grant is to be used for community involvement, property inventory, performing environmental assessments, and cleanup planning for real or perceived contamination on public or private properties along the Route 66 corridor. The coalition includes the cities of Winslow and Holbrook, Navajo County, Coconino County, the Town of Williams, and the City of Flagstaff. A potentially large number of sites would qualify for cleanup, although only one site has completed an assessment and qualified as of 2015.

Economic Pillar

A strong economy is an equally important facet for a sustainable and resilient Coconino County. Promoting industries and businesses that are compatible with social and environmental goals highlighted in this *Comprehensive Plan* provides opportunity for long-term community vitality.

Infrastructure: Infrastructure is important to economic development. The County can help pursue infrastructure improvements to promote small business in a way that is fair and equitable. A realistic understanding of infrastructure constraints is important. Many areas of the county have limited Internet and package delivery services that limit or slow residential and commercial access to online commerce. The County can support the expansion of such services but there are limits to the services we can provide. The County will help facilitate infrastructure improvements that build healthy, resilient, and prosperous communities.

Tourism: One of Coconino County's greatest assets is its open space and the quality of the natural environment. Outdoor recreation and the tourism industry benefit from these assets and constitute large proportions of the economy and employment opportunities for residents. Therefore, to continue to thrive in these nature-based industries, it is important to recognize and protect our natural areas and resources. We can still expand the economy within these areas, including developing ***ethno-tourism*** and ***agritourism*** industries in addition to our already thriving ***ecotourism***.

Federal Land Management: The management of large swaths of public lands by the federal government is an essential aspect of economic and environmental sustainability for Coconino County and its residents. The resources that are channeled into local economies, the jobs that employ large numbers of residents, and the stable management of public lands by the ***U.S. Forest Service (USFS)***, ***National Park Service (NPS)***, and ***Bureau of Land Management (BLM)***, in particular, remain vital.

Ranching: Ranching remains an important part of Coconino County's economic health and community character. Additionally, a thriving ranch economy maintains long-term, stable, land-use and conservation patterns. Working with ranchers to identify value-added opportunities in addition to traditional ranching practices can help to maintain these working lands, which are vital to the character and environment of the county.

Cottage Industries: Not all economic development is synonymous with increased building and infrastructure; cottage-based industries that do not negatively impact the neighborhood character support economic development with minimal impacts to natural or infrastructure resources.

Green & Emerging Markets: Identifying major waste streams throughout the region and creatively finding uses for them can build an economy while preserving the natural environment. An example is finding uses for the small-diameter trees that are removed in the thinning of forests, such as through the 4FRI efforts. Flexible zoning that protects property while allowing for new sustainable industry is important to aid in the reuse of these products. Additionally, having a diverse economy and workforce that includes targeted industry development can support economic vitality and community resilience because the economy is not tied to one sector or industry. Green market development supports industries that can build on the county's natural assets, while minimizing negative impacts to the community and environment. Examples of such industries include solar and wind, green-resource efficient building and infrastructure development, local food production, high-tech, research, biotech, and hospitality.

Workforce Development: To take advantage of a diverse economy, we need a workforce that is prepared to address industry needs and is trained for new economic opportunities. The County supports efforts that provide well-paying, high-quality employment opportunities for its members, as well as educational opportunities for all ages and levels of knowledge, including community events such as the Festival of Science and other educational conferences.

Natural Environment: It is important to protect the natural environments of northern Arizona are important because they support economic revenue streams such as tourism. These revenue streams bring financial benefits to a variety of associated industries such as hospitality, restaurants, entertainment, and transportation.

Social Pillar

Social sustainability addresses not only health but also the quality of life. While promoting policies that address social equity and sustainability, the County can work to ensure that every citizen has an equal opportunity to the pursuit of happiness. This process, in part, entails providing opportunities for civic engagement and for citizens to provide input in the shaping of the county. These opportunities can help foster community connectivity and balance what is fair and/or equitable in decision making.

Informed Public: Coconino County has an essential role in keeping the public informed about a broad range of information. Because of the county's size and the number of collaborators involved in shaping projects and programs, it is often difficult for the public to remain aware and informed, particularly in decision-making processes. Expanding on this already assumed role, the County will work to develop strategies and take advantage of new technologies that provide opportunities for the public to be informed and involved. This concept is particularly important in the far-reaching and more rural areas of the county, where distance and broadband access provide challenges.

Income Inequality: The economic conditions that define Coconino County offer significant opportunity and reason for optimism; however, income inequality continues to widen and generates particular concern as the County works to shape a resilient future. Although this issue has been at the forefront of a national economic discussion in recent years, the statistics in Coconino County provide reason for action. Median household income, general poverty rates, and poverty rates among children paint a challenging picture in comparison to state and national data. The combination of low incomes and high housing costs (particularly in the Flagstaff area) makes it difficult for an increasing number of residents to fully contribute to the social and economic fabric of the community. Of particular concern is the creation of disparities in the accessibility to essentials such health care, transportation, and healthy food options.

Housing Affordability: The median price of housing in Coconino County doubled between 1987 and 2002 and increased another 18% in the past decade—despite the national drop in prices related to the recent recession. Median home prices in Coconino County exceed $220,000 but are only $165,000 statewide. The median household income from 2009–2013 was $49,555 according to Census data. This means that over half of the households in the county cannot afford a median-priced home based on the Housing and Urban Development (HUD) measure of affordability. More than 20% of the population is below the federal poverty level and vacancy rates are less than 3%, adding to the difficulty of obtaining housing here.

Part of providing fair and/or equitable opportunities is ensuring that housing is attainable to people on all spectrums of the economic scale. Land use decisions regarding housing should consider including ***affordable housing*** as a component. Likewise, sustainable building practices should be promoted—they have positive economic benefits because the help ensure the long-term affordability of a house by reducing energy and water costs, which are significant over the life of a household. The Sustainable Building Program assists residents with methods for reducing the cost of maintaining a home. Potential homebuyers can also find help through other programs offered by the ***Northern Arizona Council of Governments (NACOG)***, the Housing Authority, and the Coconino County Community Services. These programs offer down payment and mortgage assistance.

Nonprofit organizations such as Housing Solutions of Northern Arizona and Habitat for Humanity are active in the county and support families in need of housing. Housing Solutions of Northern Arizona assists low-income (those who make up to 80% of the area's median income) families in purchasing homes. Habitat for Humanity helps people obtain affordable housing by constructing, rehabilitating, and preserving homes, and by advocating for fair and just housing policies. Both organizations provide training and access to resources to help families improve their shelter conditions.

Another solution, affordable housing land trusts, holds the land but allow owners to purchase the improvements upon that land. This allows low-income owners to purchase housing who could otherwise not afford it. The system balances low- to moderate-income owner's equity with permanent affordability. Housing is sold at a price that is determined to be affordable and the resale value is limited by covenant or easement.

Star School. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

Sustainable Construction: Sustainable building practices are healthier for the occupants and the environment. They conserve energy and water, limiting environmental impacts. Buildings constructed using these practices have superior indoor environmental quality. They incorporate environmentally sensitive site planning and resource-efficient materials. One example is a hogan (a traditional Navajo dwelling) built using locally harvested, small-diameter logs. Although the trees that supply these logs are often unusable in the timber industry, they must be thinned to maintain forest health and prevent catastrophic wildfires. Many alternative building materials are readily available on the market. Alternative building styles, such as rammed-earth and straw-bale homes, should be promoted as an appropriate and marketable housing product.

An important function of sustainable building is to reduce energy consumption through architectural design. Techniques such as installing more efficient insulation, heating, and cooling systems; placing windows where they can best take advantage of solar energy; and weatherizing can dramatically reduce the amount of energy we consume. Many of these measures can be implemented at minimal additional cost to conventional construction and can help ensure the long-term affordability of operating and maintaining homes and buildings.

Food Security: As the climate changes, ensuring access to food and water will be important to the health and wellbeing of residents. By supporting local agriculture, ranching industries, and other food production, the County is helping to provide food security in the event of emergencies. Removing barriers to small-scale agriculture and preserving working lands will help the community be resilient.

Except in a few limited areas, virtually no farmland is used for large-scale commercial production in Coconino County. Fredonia has a few small family farms, the north end of the Timberline-Fernwood area features pumpkin and bean farms, and Oak Creek Canyon has a few apple orchards. Additionally, lands across the county were historically used by, and remain important to, Native Americans for the collection of significant plants—both as a food source and a renewable source of material for traditional crafts, such as dye-plants for weaving and fibers for basketry. Following European settlement, considerable potato and bean farming occurred in the Flagstaff area, but most of these areas have been converted to development. However, more small-scale production is occurring in response to the growing interest in local food and farmer's markets and a desire to reduce the cost of living for families. In many areas of the country, people are finding that even very dense land uses can be compatible with raising chickens, bees, and growing food. Many small farm animals such as pot-bellied pigs and goats have no more impact on adjacent properties than typical household pets. In addition to being able to grow food to feed their own family, residents are looking to buy and sell goods with their neighbors. As of 2015, the *Zoning Ordinance* is being updated to further support the goals and policies identified in this Plan, including those pertaining to small-scale agriculture.

Emergency Preparedness: Emergency preparedness is an important part of community resiliency. As a regional leader, the County partners with other agencies to provide emergency preparedness and response services, including public planning and safety for natural disasters such as fire, flood, and severe weather storms. Multigenerational thinking accounts for the way projects may affect human and environmental health, such as potential hazards associate with importing pests like mosquitos that spread diseases. Land use decisions should also consider environmental justice and ensure that impacts are not being heavily borne by any one culture or economic group.

Climate Change: The impacts of climate change on human health are becoming prevalent; reports on the impacts to humans from increased temperatures, severe weather patterns, natural disasters are growing, causing instability of energy, food, and water resources. The County can address the impacts of climate change on its residents by supporting strategies that minimize greenhouse gas emissions and by implementing practices that support community adaptation and resiliency.

GOAL

Incorporate and support integrating the principles of sustainability and long-term community resilience and prosperity into future land use and development plans, as well as the actions and decisions of elected and appointed officials.

POLICIES

1. Develop and support programs, plans, and partnerships that work to mitigate climate change and its impacts, as well as develop adaptation strategies for long-term resiliency and vitality.

2. Develop collaborations with a wide variety of communities across the county to maintain regional economic, environmental, and cultural diversity.

3. Implement organizational improvements and methods to track and measure county resource consumption, waste, and impacts, and modify actions as needed to meet today's needs while maintaining resources for future generations.

4. Continue to engage in the brownfields programs and remediate properties so they may be used to their fullest extent.

5. The County supports the creation of an affordable-housing land trust that would acquire housing and use it in a system that balances low- to moderate-income owner's equity with permanent affordability.

6. The County will pursue state and national standards for sustainability and resiliency within County planning documents, County-developed projects, and internal policy and practice.

7. Develop awareness of the broad impacts of decisions on all three facets of sustainability and look for ways to accomplish multiple goals while maintaining private property rights.

8. In decision-making, consider the value of the long-term health and wellbeing of residents, ecosystems, and a thriving economy.

9. Develop strategies for wise restraint, recognizing that sometimes the best choices for the long term are not the easy choices.

10. Use the *Zoning Ordinance* to increase the ability of residents to partake in agricultural practices for food and fiber on their properties or within a residential neighborhood while encouraging low-water use and water-conservation technologies.

11. Continue the County's sustainability programs and educational initiatives, and explore incentives to use sustainable building practices that minimize the consumption of energy, water, and other resources.

12. Support communities and land managers in their effort to restore forest health, reduce the likelihood of high-severity wildfire, and safeguard watershed health.

13. Implement organizational improvements that will better enable the County to provide its residents with the most up-to-date information using a variety of methods.

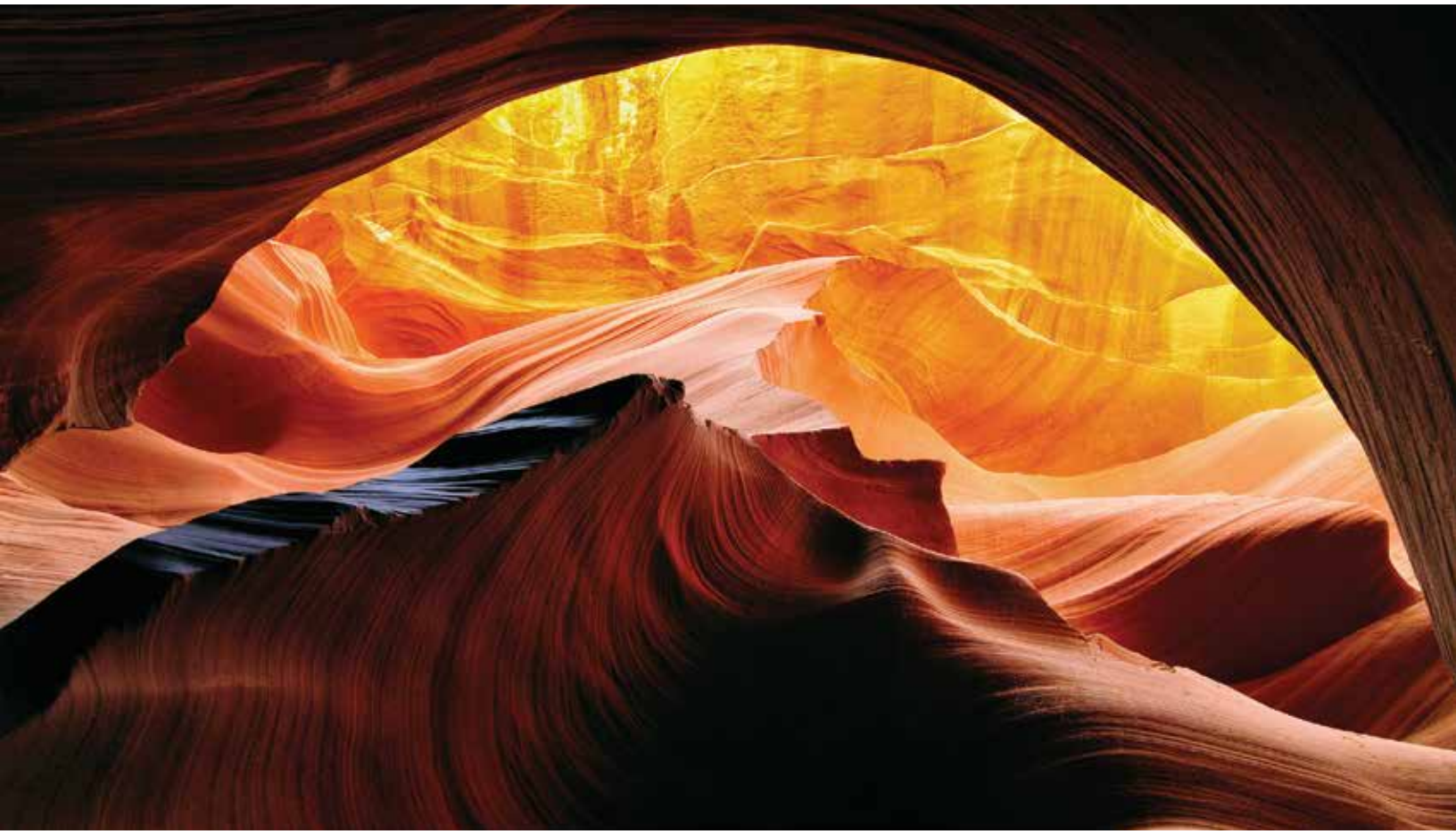
14. Encourage household resiliency so that residents are prepared for the temporary loss of infrastructure, services, or other emergencies.

15. Use County programs and policies to help reduce disparities in access to health services, transportation, and healthy food options.

16. The County will explore flexible pilot permitting that facilitates sustainable and innovative projects that support the goals of this *Comprehensive Plan*.

17. The County will work cooperatively with the public and agencies to protect scenic viewsheds, prevent fragmentation of open lands, preserve important wildlife habitat, protect watersheds, and provide buffers between developed areas.

Greenhouse. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM



Slot canyon, Lake Powell.
COCONINO COUNTY PUBLIC INFORMATION OFFICE

Natural Environment

INTRODUCTION

The quality of its natural environment defines Coconino County. Dramatic landscapes and recreational opportunities attract visitors and provide amenities to residents. Unfragmented habitats and ***wildlife corridors*** maintain ecological and species diversity. Scenic viewsheds, air quality, water quality, and other environmental features like dark skies provide important quality-of-life values for residents. Time and again, county residents have supported the conservation and ***stewardship*** of natural resources, as well as the maintenance and restoration of healthy ***ecosystems***. Many residents have strong, traditional connections with lands, waters, and wildlife that go back many hundreds of years. This Plan strives to honor this relationship by both supporting traditional uses and practices and by promoting wise stewardship of our natural environment. The goals and policies of this chapter reflect this commitment to ***conservation*** of the environment in relationship to land uses that intersect with important natural features.

As discussed in the "Sustainability & Resiliency" chapter, Coconino County is committed to recognizing the interconnectedness of environmental, economic, and social factors in negotiating sustainable land-use outcomes. It is fully acknowledged that a balance must be found between conservation efforts, economic trade-offs, and private property rights. This important balance will conserve natural systems and landscapes, expand growth in the tourism-related economy, and help maintain property values.

Upper Sycamore Canyon.

This chapter establishes goals and policies that will conserve ***environmentally sensitive features***, wildlife habitat, and native plant communities; improve the health of forest ecosystems; minimize soil erosion; and improve air quality so residents can continue to enjoy this unique natural heritage.

COLLABORATION IS NECESSARY

Most lands within Coconino County are managed by federal, state, and tribal agencies. In this context, it is essential that the County work collaboratively with these entities, along with incorporated communities and private landowners, to carefully plan in a way that minimizes the impacts of future development on water resources, environmentally sensitive features, and wildlife habitat. Looking ahead, this context will require the County to work across boundaries to find creative and functional solutions to regional challenges.

ENVIRONMENTALLY SENSITIVE FEATURES

Environmentally sensitive features are elements in the landscape that are particularly important to supporting wildlife and plant diversity and are, at the same time, especially sensitive to degradation. Environmentally sensitive features such as surface water and associated vegetation, floodplains, critical habitat, steep slopes, ridgelines, and large-diameter trees and snags need to be considered during the initial stages of the development-design process. Through ***integrated conservation design*** or similar measures, we can maintain or increase land values by retaining as many of their natural characteristics as possible. In some cases, development setbacks or buffers from environmentally sensitive features provide adequate protection; in others, the surrounding topography and land uses are important considerations in planning for their protection.

Because water is scarce in Coconino County, features such as streams, wetlands, lakes, springs, riparian areas, floodplains, and their associated ecosystems are particularly valuable and vulnerable to impacts. Riparian and wetland areas comprise less than half of 1% of the surface area of Arizona—yet 80% of Arizona's wildlife species use this ***habitat*** at some point in their lives[1]. Floodplains and ***riparian areas*** often also serve as

[1] Chaney, E., W. Elmore, and W. S. Platts. 1990. Livestock grazing on western riparian areas. U.S. Environmental Protection Agency. 45 pp.

wildlife movement corridors. Likewise, springs and seeps provide unique habitats for a variety of invertebrates and plants, many of which occur nowhere else in North America. Seventeen of the twenty of Coconino County's federally ***threatened or endangered species*** (animals) live in water or riparian habitat (see **Table 1** at the end of this chapter). In addition, ***floodplains***, ***wetlands***, and riparian areas perform important ***ecosystem services*** to humans, such as flood attenuation, water filtration, and groundwater recharge. Some springs and sensitive habitats are considered not only critical environmental attributes but also sacred cultural sites.

Water sources can be easily degraded by human activities. Ground disturbance can degrade aquatic environments through changes in hydrology and water quality. When groundwater levels drop because of human use or changes in precipitation, springs and streams can dry up. The potential for conservation action depends on several factors. One is our ability to influence water resource development and public land-management decisions. Another is our ability to provide guidance and incentives to private landowners for conserving and restoring these important features. The Natural Resource Conservation map (at the end of this chapter) displays some of these features throughout the county.

Top: Colorado River from Navajo Bridge.
Middle: Lee's Ferry.
Bottom: Sandy's Canyon.

Steep slopes and ridgelines are also environmentally important and sensitive to disturbance. Steep slopes frequently host a wide range of vegetation and habitat types that support high biodiversity. Ridgelines are often used by migrating birds and mammals to navigate across the landscape. At the same time, property owners often desire steep slopes for residential construction because they can offer spectacular views. However, because they often feature unstable and erodible soils, development can result in soil loss and degradation. Furthermore, structures built along steep slopes or ridgelines can disrupt or inhibit animal movement. As of 2015, the County's ability to manage development on such features is limited, although it does have the authority to adopt a regulation that would do so.

Many tracts of grasslands in northern Arizona have deteriorated in the last 130 years in response to a number of factors, including historic overgrazing, fire suppression, encroaching woodland vegetation, and housing development[2]. Some wildlife species associated with grasslands have also declined, including American pronghorn antelope, Gunnison's prairie dog, and black-footed ferret[3]. The majority of grasslands in Coconino County are privately held, so restoration and conservation of this ecosystem will fall primarily to ranchers and other private citizens. Grasslands and the wildlife that depend on them should be conserved through measure such as practicing appropriate livestock and range management, removing encroaching woodland vegetation, preventing invasive weed spreading, minimizing new roads and fences, modifying fences to allow wildlife passage, and reintroducing fire where appropriate.

Timber harvesting practices during the last 130 years have left few remaining stands of old growth ponderosa pine trees in Coconino County. The large-diameter trees and the snags that remain provide important habitat features for many forest-dependent wildlife, including endangered and sensitive species. Where possible, old growth trees should be retained and forest thinning practices elsewhere should strive to create a distribution of tree age classes that support habitat diversity.

[2] The Landsward Institute, 2005. The Importance of Grasslands in Northern Arizona. http://www.landsward.nau.edu/document_forms/Final%20Grasslands%20Brochure%202005%201%20MB.pdf
[3] AGFD. 2012. Arizona's State Wildlife Action Plan: 2012–2022. Phoenix, Arizona.

Eastern Collared Lizard, Red Butte. HANNAH GRISCOM

GOAL

Protect the integrity and resiliency of the natural environment with special attention to environmentally sensitive features.

POLICIES

1. The County encourages the protection and restoration of environmentally sensitive features as opportunities arise and resources become available.

2. The County recognizes the overlap between some environmentally sensitive features and their importance as traditional tribal, sacred, and cultural sites, including but not limited to springs, caves, eagles nests, and plant gathering areas.

3. The County will consider adopting ordinances that explicitly protect environmentally sensitive features from the impacts of development.

4. The County will pursue developing a Coconino County Natural Resource Inventory System that houses publicly available datasets related to environmental assets for use in project planning and review.

5. Development projects and subdivisions, including the placement of lots, alignment of roads, and installation of other structures and infrastructure, will be designed to minimize alterations to natural landforms, hydrology, and native vegetation and to maximize the conservation of environmentally sensitive features.

6. Development projects will be located outside of floodplains to prevent property damage, protect riparian areas, and facilitate water infiltration into the ground. Floodplains will be delineated by the County using the best available data.

7. The County promotes the use of tools such as conservation easements, integrated conservation design, open space dedication, fee-simple acquisition, and transfer of development rights to protect environmentally sensitive features, habitat, and open space.

WILDLIFE

Coconino County features impressive, grand ***landscapes***, valued not only for their scenic qualities, but also for the wildlife that inhabit them. Like soils and vegetation, healthy wildlife populations and biodiversity are integral to ecosystem health. They also provide high aesthetic value to residents who enjoy seeing wildlife and knowing that populations are robust. In addition, wildlife-oriented recreation such as hunting, fishing, and viewing typically contribute roughly $325 million to Coconino County's economy every year[4,5].

Coconino County contains large blocks of federally owned land that is managed to remain in a natural state. These public lands contribute significantly to the mobility and persistence of many native wildlife populations. Private and State Trust lands provide not only important habitat but also key linkages between blocks of public land. Many species such as elk and black bear have large home ranges and depend on this habitat connectivity to access needed resources across seasons and years. Consequently, the best way to sustain wildlife populations into the future is to minimize fragmentation and ensure that habitat remains connected by viable movement corridors. Roads and development are examples of activities that can fragment habitat and reduce wildlife movement, which can result in fewer animals supported by the environment.

Wildlife movement corridors are swaths of land that allow wildlife to move through even when the surrounding landscape is converted to other uses. For highly mobile species such as birds and bats, a series of migration stopovers (such as wetlands) can function like a movement corridor. However, for most wildlife species, a movement corridor must be continuous and free of barriers such as roads, railways, high fences, and human development.

With significant funding from Coconino County, the ***Arizona Game & Fish Department (AGFD)*** has mapped wildlife movement corridors[6,7] using information from biologists, radio-collared animals, and GIS models (*see the Natural Resource Conservation map at the end of this chapter*). As these mapped corridors are reviewed during the land use planning process, resource experts evaluate identified corridors, along with the best available data, to make management recommendations. It may not be necessary to preserve the entire corridor to maintain its ecological function; rather, it should be managed to minimize and mitigate barriers that would otherwise constrain animals from moving through as they access adjacent habitat. Conserving continuous portions of these wildlife corridors into the future will allow seasonal movement of species, keep populations genetically connected, and potentially increase wildlife resilience to climate change [8].

Top: Pronghorn antelope. AZ GAME AND FISH DEPT
Above: Mountain King Snake, Mt. Elden.

[4] AGFD. 2013. Economic Impact of Fishing in Arizona. Study conducted by Responsive Management for the Arizona Game & Fish Department.
[5] U.S. Department of the Interior, U.S. Fish & Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2011. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.
[6] AGFD. 2011. The Coconino County Wildlife Connectivity Assessment: Report on Stakeholder Input. Flagstaff, Arizona. http://www.azgfd.gov/w_c/conn_Coconino.shtml.
[7] AGFD. 2013. Coconino County Wildlife Connectivity Assessment: Detailed Linkages. San Francisco Peaks – Mogollon Rim Linkage Design. Phoenix, Arizona. http://www.azgfd.gov/w_c/conn_Coconino.shtml.
[8] The Arizona Wildlife Linkages Workgroup, 2006. Arizona's Wildlife Linkages Assessment. Phoenix, Arizona. http://azdot.gov/docs/planning/arizona_wildlife_linkages_assessment.pdf?sfvrsn=7

Figure 1. Artist's rendering of a proposed American pronghorn overpass to facilitate movement across State Highway 89 at milepost 441[1].

[1] AGFD. 2011. Assessment of Pronghorn Movements and Strategies to Promote Highway Permeability: US Highway 89. Final Report 619. Prepared for ADOT Research Center.

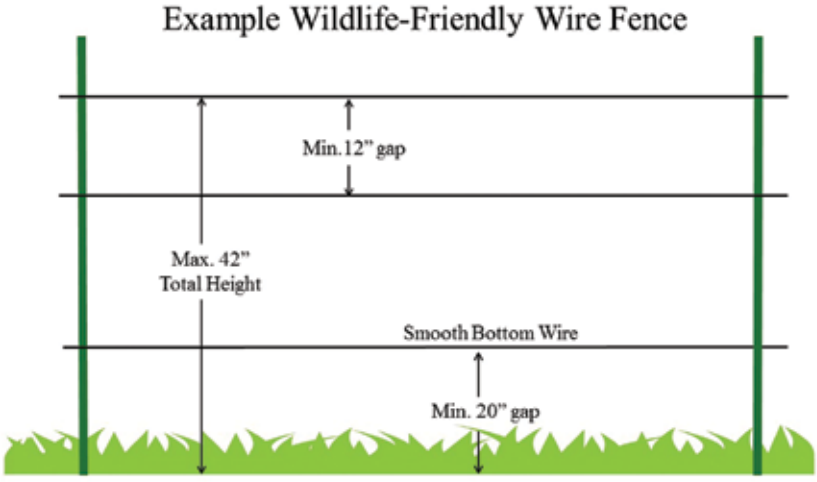
Another effort led by AGFD and the ***Arizona Department of Transportation (ADOT)*** has identified sections of highways in the county that currently inhibit wildlife movement but could be improved by providing crossing systems in the future. Such systems usually include fences that "funnel" wildlife through existing or constructed highway underpasses or overpasses. **Figure 1** depicts a proposed American pronghorn overpass on State Route 89. Initial results of a wildlife crossing system along Interstate 17 south of Flagstaff show that elk and deer learn to use the crossings, resulting in a 97% decrease in wildlife-vehicle collisions on the freeway (from 20 collisions per year to 1)[9]. Expanding these efforts along highways across the county will benefit both people and wildlife in coming years by reducing collisions and increasing wildlife connectivity and mobility across major highways.

Twenty species in Coconino County are federally listed as ***threatened or endangered*** (T&E) under the *Endangered Species Act (ESA)* (**Table 1**). The majority of these species depend on aquatic environments, which are fed primarily by groundwater and which require stable groundwater levels in regional aquifers. Impacts to these federally listed species are assessed and regulated by the ***U.S. Fish & Wildlife Service (USFW)***. AGFD also maintains a list of Species of Greatest Conservation Need (SGCN) in Arizona, which categorizes species by their level of rareness and vulnerability. Coconino County supports the conservation of T&E-ESA and SGCN-listed species. Because land conversion and development have the potential to impact these species, the County will work proactively with developers to minimize and mitigate impacts to them.

[9] AGFD. February 2014. Evaluation of a Wildlife Fencing Retrofit along Interstate-17; Munds Park to Woods Canyon, Quarterly Progress Report. Prepared for ADOT Research Center.

Table 1: Animal Species listed on Endangered Species Act within Coconino County

Common Name	Scientific Name	Status	Animal
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	Amphibian
California condor	*Gymnogyps californianus*	Endangered	Bird
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	Bird
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Bird
Yellow-billed cuckoo	*Coccyzus americanus*	Threatened	Bird
Gila chub	*Gila intermedia*	Endangered	Fish
Gila topminnow	*Poeciliopsis occidentalis*	Endangered	Fish
Bonytail chub	*Gila elegans*	Endangered	Fish
Colorado pikeminnow	*Ptychocheilus lucius*	Endangered	Fish
Apache trout	*Oncorhynchus apache*	Threatened	Fish
Gila trout	*Oncorhynchus gilae*	Threatened	Fish
Humpback chub	*Gila cypha*	Endangered	Fish
Little Colorado spinedace	*Lepidomeda vittata*	Threatened	Fish
Razorback sucker	*Xyrauchen texanus*	Endangered	Fish
Loach minnow	*Tiaroga cobitis*	Endangered	Fish
Spikedace	*Meda fulgida*	Endangered	Fish
Kanab ambersnail	*Oxyloma haydeni kanabensis*	Endangered	Invertebrate
Black-footed ferret	*Mustela nigripes*	Endangered	Mammal
Narrow-headed gartersnake	*Thamnophis rufipunctatus*	Threatened	Reptile
Northern Mexican gartersnake	*Thamnophis eques megalops*	Threatened	Reptile



AZ GAME AND FISH, HANNAH GRISCOM

American pronghorn antelope once roamed widely across the county but herds are now greatly restricted in their movements by roadways and fences. Many standard barbed-wire fences entangle and kill wildlife. However, most can be modified to allow pronghorn and other wildlife passage while still containing livestock. Removal of unnecessary fences and modification of existing fences can greatly benefit pronghorn and other species in Coconino County. More guidelines for wildlife-friendly fencing can be found online[10].

[10] AGFD. Wildlife Compatible Fencing Guidelines. http://www.azgfd.gov/w_c/documents/110125_AGFD_fencing_guidelines.pdf

California condors are an endangered species that occurs in northern Coconino County. Lead poisoning is the leading cause of death in condors and the main obstacle to condor recovery. The primary source of this lead is from ammunition used by hunters when game carcasses and gut piles are left in the field. This lead affects other species of scavengers, too. The solution is for hunters to use non-lead ammunition. The County supports condor recovery and will work with partners to promote the use of nonlead ammunition.

Gunnison's prairie dog, which is native to northern Arizona, is on the SGCN list. Partnerships can increase the County's awareness of issues and solutions to related to habitat loss. For example, local nonprofits work with jurisdictions to identify prairie dog habitats and relocate colonies in areas that are under consideration for development. Working with partners such as Habitat Harmony during the development review process increases the County's ability to respond to concerns about sensitive species and contributes to meeting this Plan's conservation objectives.

GOAL

Conserve wildlife, their habitats, and movement corridors.

POLICIES

8. The County encourages use of integrated conservation design, zoning, and other land use strategies to conserve wildlife habitat, wildlife movement corridors, and environmentally sensitive features.

9. Development projects (including roads, fences and trails) should minimize and/or mitigate impacts to federally listed (T&E-ESA) and state sensitive species (SGCN-listed species).

10. The County supports appropriate road design as well as the closure and rehabilitation of unnecessary roads that cause resource damage.

11. The County favors projects that conserve open space, wildlife movement corridors, and wildlife watering areas.

12. The County will work with partners to protect state sensitive and federally T&E wildlife and plant species.

13. The County will continue to support a wildlife planner position that contributes to land use recommendations and consults with staff, decision-makers, and the public about natural resources stewardship.

14. The County will cooperate with AGFD, ADOT, and other willing parties to maintain wildlife permeability within movement corridors and across restrictive sections of major roads, fences, and other barriers.

VEGETATION

Healthy plant communities play many vital ecological roles: soil building and stabilization, water infiltration, watershed health, heat absorption, carbon and pollutant sequestration, and habitat formation for animals and other plants. Coconino County's diverse topography creates a range of temperature and precipitation zones that support a broad array of plant communities. The bottom of the Grand Canyon (2,460 feet), for example, contains desert shrubs such as yucca, mesquite, and ocotillo, while the San Francisco Peaks (12,637 feet) feature alpine tundra above tree line. Between these elevations lie grasslands, piñon-juniper woodlands, and ponderosa pine and mixed conifer forests. Coconino County contains the largest contiguous expanse of ponderosa pine

Left: Strawberry hedgehog cactus, Vermilion Cliffs, AZ. HANNAH GRISCOM Right: Indian paintbrush.

Table 2: Plant Species listed on Endangered Species Act within Coconino County

Common Name	Scientific Name	Status	Plant
Brady pincushion cactus	*Pediocactus bradyi*	**Endangered**	**Plant**
Fickeisen plains cactus	*Pediocactus peeblesianus var. fickeiseniae*	**Endangered**	**Plant**
Navajo sedge	*Carex specuicola*	**Threatened**	**Plant**
San Francisco Peaks ragwort	*Packera franciscana*	**Threatened**	**Plant**
Sentry milk-vetch	*Astragalus cremnophylax var. cremnophylax*	**Endangered**	**Plant**
Siler pincushion cactus	*Pediocactus sileri*	**Threatened**	**Plant**
Welsh's milkweed	*Asclepias welshii*	**Threatened**	**Plant**

forest in North America. In addition, riparian areas like Oak Creek Canyon support highly diverse natural communities, where deciduous trees like cottonwood and sycamore prevail (*see the Vegetation Types map at the end of this chapter*). Seven plants in Coconino County are listed as T&E under the ESA (**Table 2**).

Invasive and ***noxious weeds*** pose an increasing economic and ecological threat to Coconino County. They are typically non-native species that become established on disturbed soil, spread rapidly into adjacent areas, and can displace native species and disrupt ecosystem processes. Efforts to manage and monitor infestations on public and private land are costly and time consuming. Some of the most problematic weeds in the county include cheatgrass, diffuse knapweed, kochia, Scotch thistle, yellow starthistle, dalmation toadflax, and leafy spurge.

The Arizona Department of Agriculture is responsible for regulating invasive weeds. It maintains a list of weeds that are subject to legal restrictions and potential quarantine. However, controlling these weeds is the responsibility of the landowner. An effective weed-management plan includes four strategies: prevention, early detection, timely management, and site rehabilitation. By focusing on these strategies, most new infestations can be prevented or controlled before they spread. Unfortunately, by the time an infestation is firmly established, it can be extremely costly to control and nearly impossible to eradicate.

Coordinated ***weed management areas*** consisting of local and federal agencies, nongovernmental organizations (NGOs), and citizen volunteers exist to spearhead invasive plant management throughout the county in the areas surrounding Flagstaff, Williams, Grand Canyon National Park, Fredonia, and the Hopi and Navajo Reservations. For example, the San Francisco Peaks Weed Management Area (SFPWMA) is the group that serves the greater Flagstaff area. The SFPWMA includes participating staff from the ***U.S. Forest Service (USFS)***, Coconino Natural Resource Conservation District, Coconino County Cooperative Extension, ***National Park Service (NPS)***, City of Flagstaff, and County, as well as other agencies and NGOs, for a total of about 27 cooperating partners. The partnering organizations actively pursue education and outreach, weed surveys, threat analysis, and direct weed control. Controls include mechanical treatment such as pulling or mowing, chemical treatment with herbicides, cultural treatment such as grazing, and biological treatment such as predatory insects or pathogens.

The effective control of invasive weeds requires cooperation across agencies, ranchers, and private citizens. When control efforts are coordinated across property lines, they are much more effective at removing infestations. New development projects in Coconino County are usually required to submit and adhere to a weed management plan. Individual citizens are encouraged to participate in weed management efforts by learning to identify and remove them from private property. More information and outreach materials are needed to help landowners identify and effectively remove weeds.

To support the successful outcomes discussed in this section, it is recommended that a position be established for a plant community liaison. This position should have the following responsibilities:

- Coordinate with other agencies to assess risk and promote the management of healthy plant communities.
- Coordinate invasive plant education and outreach activities.
- Coordinate weed management efforts across County departments.
- Consult on proposed development projects.

GOAL

Conserve and restore native plant communities while controlling populations of invasive weeds through prevention and environmentally responsible eradication.

POLICIES

15. The County will create comprehensive invasive guidance for weed management and/or a weed ordinance. Weed management plans will be required for most development and forest restoration projects involving ground disturbance or road maintenance. Management plans will be required to address preventing weed establishment and timely control.

16. Construction plans for development, infrastructure improvements, and forest restoration projects will include a plan for minimum disturbance of native vegetation and soils.

17. Landscaping for new developments shall emphasize minimizing the area disturbed and using native plants and drought-tolerant species that are appropriate to the area. Revegetating disturbed areas will be required in most cases and planting/seeding native species will be strongly encouraged.

18. The County will cooperate with all willing partners to inventory, eradicate, and control invasive, non-native vegetation.

19. The County will cooperate with private, state, federal, tribal and/or NGO partners to identify and establish a position for a plant community liaison to support and implement efforts to conserve and restore healthy native plant communities on a regional basis.

20. When new developments are proposed adjacent to public land, the County will coordinate with the USFS or another entity to minimize the spread of invasive species from private to public land.

21. The County will pursue aggressive weed-control strategies in its public rights-of-way, on other County-owned properties, along utility lines, and near construction and maintenance projects.

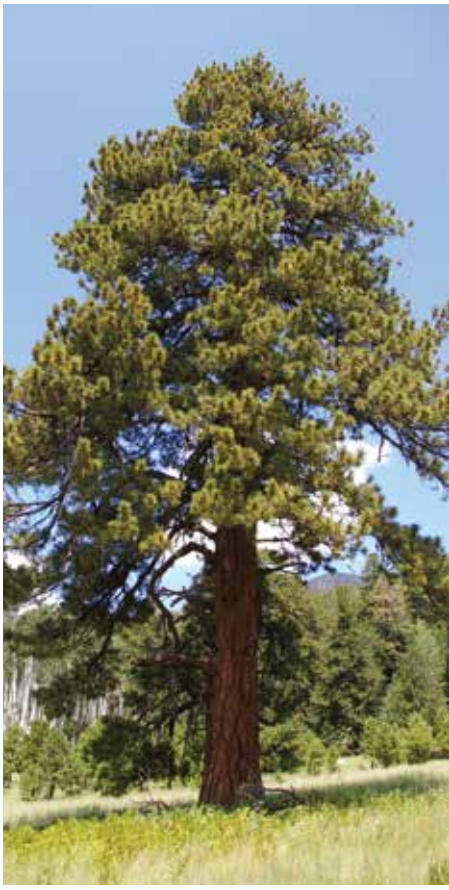
22. The County Parks & Recreation Department will pursue opportunities with other agencies and volunteer groups to control the spread of invasive weeds on public parklands and natural areas.

23. The County will support public education programs to help residents learn how to identify and control invasive weeds on private property.

FOREST & LAND HEALTH

Historic land management practices have altered Coconino County's ecosystems in the last 150 years. In particular, historic overgrazing and fire suppression have changed our grasslands, piñon-juniper ***woodlands***, and ponderosa pine forests. The result is that these ecosystems now contain more trees and shrubs per acre than they did historically, leading to decreased tree vigor, less grassland cover, and more soil erosion[11].

In the ponderosa pine forest, this ecosystem change has also led to larger, more severe and destructive wildfires than occurred historically. Today's wildfires tend to burn with greater severity, resulting in the consumption of most trees, ground cover, and organic soil. This can result in ***erosion***, downstream flooding[12], and damage to watershed health and water quality. It is estimated that forest recovery could take decades to hundreds of years following such fires[13]. Also, because severely burned areas become vulnerable to invasive and noxious weeds, these vegetative changes can be significant and often irreversible.



Ponderosa pine, Kachina Peaks Wilderness.

Ponderosa pine forest management is needed in both the ***wildland/urban interface (W/UI)*** and the wildland setting to reduce the likelihood of destructive wildfires and restore ecosystem health. In the W/UI and private inholdings within national forest land, forest

[11] Covington, W.W. and M.M. Moore. 1994. Postsettlement Changes in Natural Fire Regimes and Forest Structure. Journal of Sustainable Forestry 2(1–2).
[12] Neary, D.G., K.A. Koestner, A. Youlberg, P.E Koestner. 2012. Post-fire Rill and Gully Formation, Shultz Fire 2010, Arizona, USA. Geoderma 191, p. 97–104.
[13] Savage, M. and J.N. Mast. 2005. How Resilient are Southwestern Ponderosa Pine Forests After Crown Fires? Canadian Journal of Forest Research, 35(4): 967–977.

management should focus on thinning trees, reducing fuels, and creating defensible space around structures. Tools and approaches for avoiding fire in these settings are discussed in detail in the "Public Safety" chapter.

The Coconino and Kaibab National Forests and the ***Arizona State Land Department (ASLD)*** manage most of the forested lands in Coconino County. Forest restoration practices on these lands typically focus on restoring historic forest structure, composition, and function. These practices should aim to improve ***watershed***, forest, and soil health by creating a more open, mixed-aged structure with clumps and groups of mixed-aged trees separated by grassy openings. These restoration activities often require cutting a significant portion of the trees in a stand using heavy machinery. For a few years following such work, the forest can appear denuded and unhealthy to residents. However, with time, grasses and forbs fill in, and the resulting forest is healthier and more resilient.

Fire is a natural and necessary component of forest and land health in northern Arizona. In ponderosa pine forests, for example, fire is needed approximately every 5 to 15 years. Necessary changes to USFS policy now prescribe fire and allow many natural fires to burn in a controlled fashion. Although these fires create smoke that can be a nuisance to residents, it is necessary to let them burn. These longer-lasting, lower-intensity fires are necessary to restore our forests and can be expected throughout the region in the coming years.

Recognizing the need to apply forest restoration across the landscape, several partnerships have formed across private, public, and nonprofit sectors to facilitate large-scale efforts. The Greater Flagstaff Forestry Partnership and the Ponderosa Forest Advisory Council have been integral to advancing forest restoration science and implementation throughout the region. Currently, two large-scale projects are underway to help improve forest and land health (more detail on both projects in "Public Safety"). The Flagstaff

Watershed Protection Project is designed to avoid fire and flooding and protect drinking water for the City of Flagstaff. The Four Forest Restoration Initiative (4FRI) is slated to move towards restoring hundreds of thousands of acres across the Kaibab and Coconino National Forests. These two efforts are just beginning implementation in 2015, but they promise to yield environmental, social, and economic benefits throughout the county in the years to come.

GOAL

Improve forest and land health and promote the restoration of forest ecosystems.

POLICIES

24. Work with public and private partners to restore forest ecosystems to improve ecosystem resiliency and reduce the risk of high-severity wildfire.

25. Educate and encourage property owners to participate in fuels reduction and other measures that reduce risk to human safety and property.

26. Support fuels reduction efforts by helping find disposal methods for the resulting green waste.

27. New developments in forested areas will be assessed in terms of vulnerability to wildfire and will be required to adhere to firewise practices.

28. Forest restoration and fuels reduction projects will consider the risk to and from nearby adjacent landowners' property, resources, and environmentally sensitive features.

SOILS

Soils are important in the planning and development process for several reasons. They serve basic functions in ensuring that roads, buildings, and structures are adequately supported and that wastewater systems function properly. Healthy soils also form the basic building blocks of a healthy environment because they support vegetation, recycle nutrients, and absorb and purify water. They are integral with the native vegetation, where they develop and host a complex community of insects, fungi, roots and bacteria that enable these functions. When soils are disturbed during land development, these essential functions are disrupted. If soils are not quickly stabilized with vegetation after disturbance, then erosion, airborne dust, invasive weeds, and degraded water quality can quickly result. Topsoil (typically the top 4–12 inches) contains most of the microbial community and should be set aside before construction and re-applied after construction to facilitate the reestablishment of vegetation. If proposed projects are likely to result in erosion, an erosion and sediment control plan may be necessary in project design. Such a plan may specify approaches such as slope grading and seeding with native or desirable non-native plants.

Soils are also important in the management of wastewater. In Coconino County, a large proportion of the residential development contains on-site (septic) systems for the treatment and disposal of ***wastewater***. These systems rely on soil bacteria to break down waste material as water ***percolates*** downward. Loamy soil (a mixture of clay and sand) is the ideal texture to facilitate water filtration. Coarse sand and bedrock are examples of soils or substrates that are unsuitable for septic systems because they do not adequately filter water before it reaches the groundwater below.

Shallow or unsuitable soils make the installation of septic systems difficult and expensive because conventional septic tanks and leach fields may not be feasible. Surface water and groundwater contamination associated with septic systems often stem from failures related to their age or improper maintenance; however, even properly functioning facilities can cause water quality degradation and pose public health risks. In fact, the ***Arizona Department of Environmental Quality (ADEQ)*** has identified septic systems as a contributing factor to water quality impairment in the state.

The Coconino County Community Development Environmental Quality Division (CCCD-EQ) reviews and approves plans for both conventional and alternative on-site wastewater treatment facilities to ensure that they are designed and constructed in accordance with the Arizona State Aquifer Protection Permit (APP) Rules. Facility approval requires a "Construction Authorization" issued by CCCD-EQ. (See "Water Resources" for a discussion of the County's efforts to enable the reuse of residential wastewater for landscaping and other uses.)

GOAL:

Protect soil resources and improve soil conservation practices.

POLICIES

29. The review process for subdivision and other development proposals shall consider mitigation measures for drainage, erosion, sedimentation, and related issues with regards to the soil type, substrate, and slope.

30. Encourage the conservation of topsoil in construction and best management practices to prevent erosion and its impacts. Seeding and planting with native species after ground disturbance will be strongly encouraged.

31. In areas of shallow or poor soils where standard septic systems are not feasible, very low density development, integrated conservation design, a centralized treatment facility, and/or technologically advanced environmentally sensitive systems will be preferred.

32. Through its Community Development Department, the County will educate the public in selection of the best wastewater system for their site through designs that use fewer resources, may cost less to operate, and have fewer impacts on human health and the environment.

33. Educate septic system owners and pumpers who maintain the facilities, as well as designers, installers, contractors, regulators, and health officials on the proper siting, design, installation, operation, and maintenance of onsite wastewater treatment facilities.

AIR QUALITY

Coconino County's predominantly excellent air quality is an important asset that contributes to environmental and human health, impressive views, and quality dark skies. Influenced by prevailing wind and weather, air quality is a function of local and regional activities. Primary sources of air pollution in Coconino County are vehicles, power plants, wood burning stoves, and dust[14]. Prescribed fire and wildfire can also significantly impact air quality. All areas in northern Arizona currently meet federal standards set by the ***U.S. Environmental Protection Agency (EPA)***. ADEQ is responsible for issuing air-quality permits, monitoring air quality, and enforcing regulations.

[14] Arizona Department of Transportation. 2004. Air Quality Sustainability Program in Coconino County. Prepared by Lima and Associates. http://azdot.gov/docs/default-source/planning/finalreport04.pdf?sfvrsn=2

Planning Commissioners at Padre Canyon.

Of the many pollutants measured, ozone is of the greatest concern in Coconino County. It is often found at moderate levels during the summer in Flagstaff and the Grand Canyon and occasionally reaches levels considered unhealthy to people who are prone to respiratory problems[15]. Ozone is not associated with diminishing visibility, but it can impact plant health, which is why it is of concern to Grand Canyon National Park.

Particulate matter generally remains below levels that would impact human health[16]; however, current levels are associated with diminished visibility at the Grand Canyon and, consequently, are of concern to the NPS and others. The Navajo Generating Station (NGS), which uses coal from the Kayenta Mine, is the single largest source of air pollution in the county[17]. Found to be noncompliant with the federal *Clean Air Act*, the NGS has a new operating plan created by a 2015 agreement with the EPA.

Improving public health, protecting scenic views, and maintaining the astronomical sector of our economy requires that Coconino County continue working to improve air quality. We can encourage this by supporting energy efficiency and renewable sources of energy, promoting alternative means of transportation, implementing dust control measures, and requiring wood stove efficiency standards. Additionally, attracting new, nonpolluting industries will help us maintain high air-quality standards.

Complaints about dust from unpaved roads are common amongst residents. The County regulates the surface of roads for commercial and industrial development and subdivisions but not for all local roadways. However, there are hundreds of miles of private roadways in residential areas that the County does not maintain; in addition, there are roads where the surface material is neither regulated by the County nor maintained by homeowners.

Prescribed burns are necessary to reduce fire risk, improve forest and land health, maintain wildlife habitat, and improve grazing resources. Although this practice can cause respiratory problems for residents and its effects should be mitigated, the County strongly supports forest restoration efforts. ADEQ permits this burning, and fire managers model the smoke dispersion characteristics to determine the best timing for prescribed burns. Additionally, burning yard materials and trash is a common practice for rural residents. ADEQ and local fire districts may require permits depending on the scope of the burn.

[15] U.S. Environmental Protection Agency. Air Quality Index Reports: 2007-2014. http://www.epa.gov/airdata
[16] U.S. Environmental Protection Agency. Air Quality Index Reports: 2007-2014. http://www.epa.gov/airdata
[17] Arizona Department of Transportation. 2004. Air Quality Sustainability Program in Coconino County. Prepared by Lima and Associates. http://azdot.gov/docs/default-source/planning/finalreport04.pdf?sfvrsn=2

GOAL

Improve the county's air quality.

POLICIES

34. Where desired, the formation of road improvement, air quality, and road maintenance districts will be encouraged as a means of minimizing dust problems and allocating costs to those most affected.

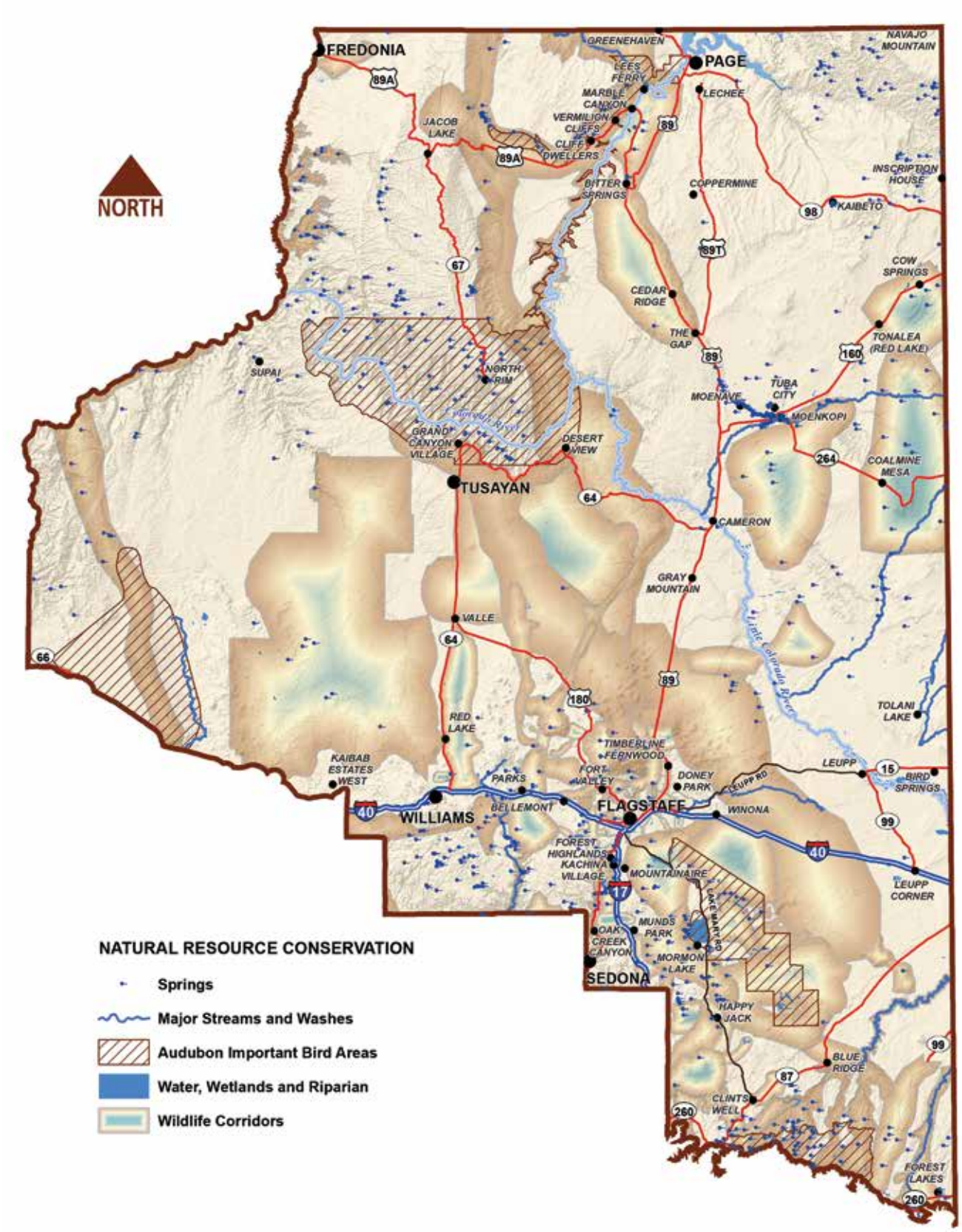
35. The County, individual property owners, property owner associations, and road improvement/maintenance districts are encouraged to provide low-dust surfaces or pursue dust-control measures on roadways under their jurisdiction.

36. The County commits to taking appropriate dust-control measures while constructing and maintaining its capital improvement projects.

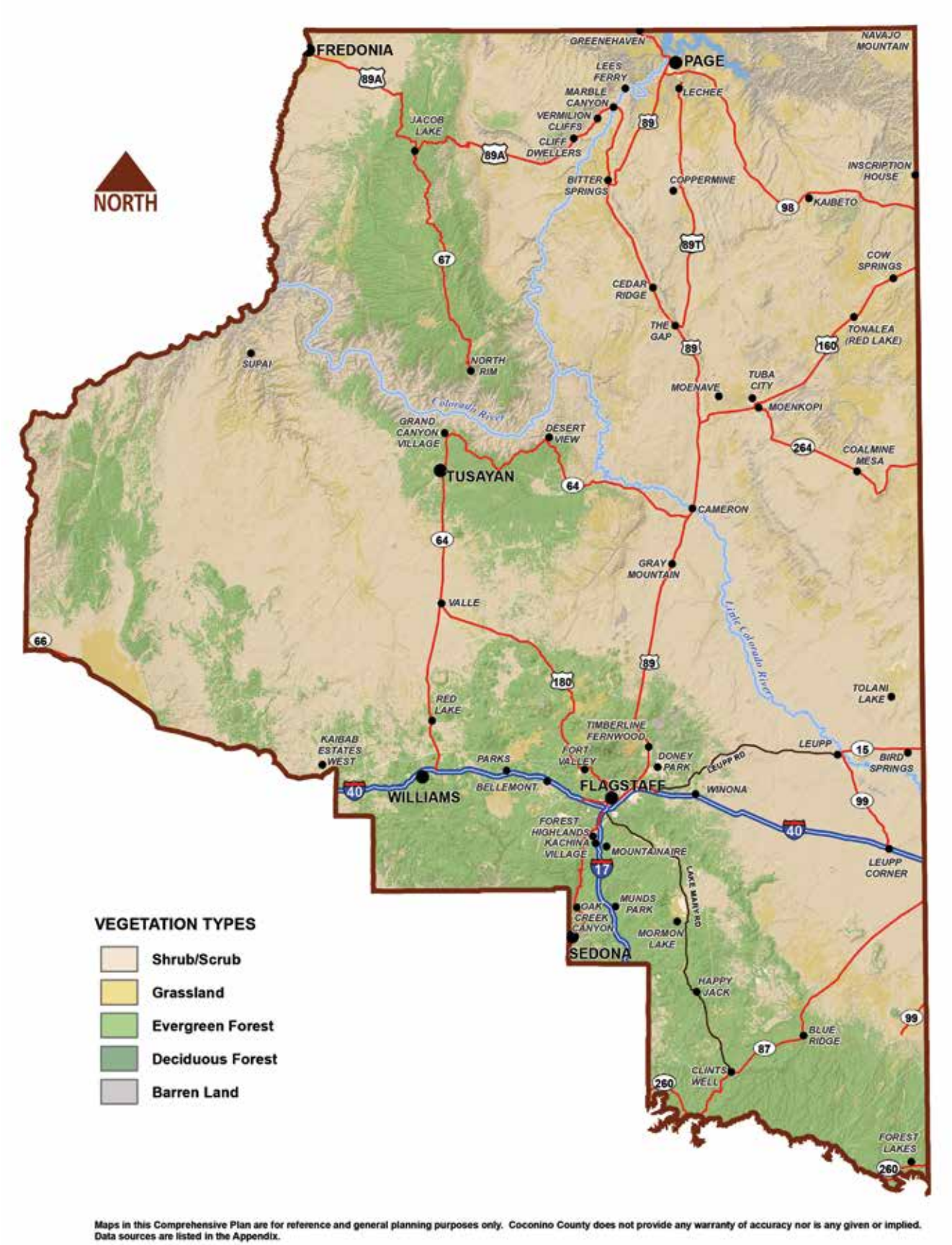
37. The County supports conservation planning and management for dust control by land users involved in ranching, farming, and forestry.

38. Economic development efforts should focus on nonpolluting industry and commercial enterprises.

39. The County will encourage public and alternative means of transportation for its residents.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.

Upper Sycamore Creek.

Water Resources

INTRODUCTION

The availability of water is one of the most critical factors in planning for the future growth of Coconino County. Balancing the needs of growth and the environment in the face of climate change promises to be complex and challenging in the years to come. To add to that challenge, the County's authority to assess and ensure long-term water supplies is constrained by overriding state law. To move towards a more water-secure future, the County should simultaneously further its efforts in the areas of long-range planning, promoting water conservation and reuse, fostering cross-jurisdictional partnerships, and considering modifications to regional and state water policy.

Water supplies are not only essential to human life but also to support wildlife as part of healthy ecosystems. The goals and policies herein address the role of conservation in this arid environment. The residents of Coconino County and the ***natural environment*** need water to survive and thrive. Through household conservation practices, county residents play a large role in ensuring the long-term availability of water. The County envisions using creative approaches to encourage ***sustainable water use***. This chapter describes existing water resources and providers in the county and addresses the demand for future water supplies. Its policies encourage sustainable water use and a more efficient regulatory framework—one that works with all entities on a regional basis to effect better water management.

REGULATORY FRAMEWORK

Although Coconino County is not a water provider and cannot assure long-term supplies, water security is clearly integral to our stability and growth. Most municipalities, communities, and households in the county draw their supplies from ***groundwater***. In many regions, water yields appear stable at this time. However, there are concerns about long-term growth and how it may impact water supplies and water-dependent ecosystems. Groundwater overdraft has been observed in areas such as Joseph City, where industrial, municipal and agricultural uses exceed natural recharge rates, resulting in aquifer drawdown and the drying of wetlands (USGS 2015). Some residents in areas with perched water tables (such as Parks and Baderville) are reporting declining or drying wells and contaminated water from neighboring septic systems. Clearly, the County needs to play a role in long-range water resources planning to protect property values and the environment while encouraging appropriate and sustainable growth (see "Meeting Future Water Needs" below). As the County tackles this effort, it must navigate a complicated web of local conditions, politics, and state and federal laws to create innovative policies and practices that are appropriate for northern Arizona.

The ***Arizona Department of Water Resources (ADWR)*** administers Arizona's surface water rights laws and groundwater codes. Most of the surface water in the county (and indeed the state) has already been allocated through existing appropriation claims (or is undergoing adjudication). Groundwater withdrawals are not nearly as constrained. Under current state law, any landowner can drill a water well on his or her property as long as it pumps less than 35 gallons per minute and lies outside of an ***Active Management Area (AMA)***. As of 2015, no part of Coconino County lies within an AMA. The challenge with Arizona groundwater law is that the cumulative impact of multiple wells pumping from the same aquifer and the potential impacts of groundwater overdraft are not considered in the permitting of new developments or the appropriation of new wells.

In 2007, the Arizona State Legislature passed the Mandatory Adequate Water Supply Program (Senate Bill 1575), which gave counties and cities the ability to require new developments (more than six parcels) to demonstrate a 100-year water supply for its residents for approval by ADWR and the platting agency. Currently, the Program has been adopted by Cochise and Yuma Counties and the Cities of Patagonia and Clarkdale. Because each 100-year adequacy assessment must account for the ongoing water uses of surrounding wells, the program encourages sustainable growth through an analysis of local water supply and demand. Enrolling in the Mandatory Adequate Water Supply Program is one way the County could move towards more sustainable water use. One potential drawback to requiring developers to prove water adequacy is that it could motivate some to circumvent the subdivision process, resulting in more ***lot splits***. To enroll in the program, the County would have to request a waiver from the state that would allow groundwater below 1,200 feet to qualify as an adequate water supply (a similar waiver was granted to the City of Flagstaff in 2009).

The County could investigate the possibility of working with communities at risk of overdraft to create AMAs for one or more of its associated groundwater basins. However, there are serious questions about the suitability and effectiveness of the AMA structure in Coconino County. Significant aspects of AMAs include establishing groundwater rights and permits, prohibiting new agricultural irrigation, creating water management plans that include mandatory conservation measures, requiring those who operate nonexempt wells to monitor and report pumping, and charging a management fee for all groundwater withdrawals. Another key aspect of AMAs is the requirement for proving an "assured water

supply" for any new subdivision (similar to the Mandatory Adequate Supply Program).

By working with ADWR, the State Legislature, and other partners, we may identify other options for creating more local and regional oversight on water withdrawals (such as well spacing requirements). Along with incentivizing water conservation, these measures could help prevent overdraft of the county's groundwater supplies.

GOAL

To pursue and implement long-term management policies that ensure sustainable water supplies for future generations and the natural environment.

POLICIES

1. In coordination with appropriate agencies, the County will pursue local, regional, and/or state policies that support sustainable water management by allowing for the analysis of cumulative impacts to long-term supplies.

2. The County will actively participate in and pursue programs and activities that address the conservation and management of regional water resources.

3. To the extent allowed by state law, the availability of water should be a primary consideration for all development applications filed in conjunction with a rezoning for higher density.

MEETING FUTURE WATER NEEDS

Coconino County has been engaged in local water planning efforts over the last 15 years. It helped formulate the Coconino Plateau Water Advisory Council and Watershed Partnership in 2000 (CPWAC&WP). Today, the CPWAC&WP continues to function as an interagency group that is addressing the issues surrounding regional water security. A major accomplishment of the group has been completing the North Central Arizona Water Supply Study (NCAWSS) in 2006[1].

The area analyzed for the study encompasses most of Coconino County, including tribal lands. The study's objectives were to determine if there would be unmet demand for water in the future (into the year 2050) and to identify potential sources to meet those demands.

The study found that per-capita water use varies widely according to ease of availability and cultural norms, ranging between 50 to 200 gallons per person per day. Overall, the NCAWSS projected a doubling in water demand by 2050. In many areas, especially in the rural parts of the county, this demand will undoubtedly be met by additional development of the C and R-M Aquifers. However, in areas where groundwater is already heavily used, there are potential problems with substantial additional development of these aquifers. The study found that unsustainable withdrawals are possible in some areas, withdrawals that will negatively impact perennial waters such as rivers, creeks, springs, and seeps downstream from wells. This could lead to habitat degradation of these ***environmentally sensitive features***. Such impacts have already been observed in eastern Coconino County where industrial, agricultural, and municipal uses have resulted in a lowered water table and the resulting drying of some wetlands along the Lower Colorado River (D. Bills (USGS), personal communication, May, 2015). In addition to environmental consequences, the drying of springs and rivers poses potential water rights problems with downstream users. Also, this consequence is unacceptable to many residents, including Native Americans, who hold some of these waters sacred.

[1] U.S. Department of Interior Bureau of Reclamation. 2006. North Central Arizona Water Supply Study.

In addition to further groundwater development, the NCAWSS identifies Colorado River water from Lake Powell (via pipeline) as the most likely source to meet future unmet water demands across the county and on tribal lands. This water could come from pending Native American water rights settlements and/or the reallocation of Colorado River entitlements in 2021. However, nontribal partners would have to lease or purchase water from tribal entities, which may not be willing or able to sell. Also, the cost of building a pipeline to both tribal and nontribal demand areas would be very expensive and it is currently unclear if the effort could be funded. Finally, under this scenario, many rural residents of Coconino County would not benefit significantly from the pipeline since they would need to haul water from standpipes to their residences.

The City of Flagstaff has taken steps to assure future water supplies for its growing population without drawing from the Colorado River. In a recent study[2], the City determined that future demands within city limits would outpace surface water and groundwater recharge rates starting in 2036. In an effort to meet its projected water demands, the City has purchased Red Gap Ranch east of Flagstaff and its associated water rights. Efforts to fund a pipeline that would bring that water to Flagstaff are just beginning.

Changing climate and natural drought cycles pose additional challenges to long-term water planning in Coconino County. Average annual temperatures in the Southwest are consistently rising because of climate change. This has led to reduced annual snowpack, less naturally occurring groundwater recharge, dryer soils, and more severe periods of drought[3]. Also, long-term climate records show that droughts spanning several decades are normal in the region and are likely to occur in the future[4]. Future water resource projections and scenarios should err on the side of caution by incorporating the influences of climate change and variability.

Coconino County needs a robust plan for its water future. The NCAWSS lays out a clear picture of what our unmet demand will be. Future policies need to establish a process that strives to ensure sustainable water supplies for its residents while protecting the ecological integrity of aquatic and riparian systems and providing water resources for fish and wildlife. This process requires technical evaluations and political engagement. It should integrate our understanding of geohydrology with the physical locations of areas of unmet demand, planned growth, and designated growth. This effort should be coordinated with municipalities, other water users, and water providers to create a regional management plan. Such a plan should consider all the available science and potential actions in the areas of state and local water policy, water conservation and outreach, environmental water needs, water reuse, and rainwater capture; it should also identify potential additional sources from outside the region. Some municipalities within the county have undertaken these types of detailed studies and those studies should be considered. The CPWAC&WP, which has already made advances in these areas, is best positioned to lead such an effort at this time.

GOAL

Ensure a sustainable water supply for human communities while protecting natural systems.

[2] City of Flagstaff. Utilities Integrated Master Plan. 2013 draft.
[3] U.S. Environmental Protection Agency. 2015. http://www.epa.gov/climatechange/impacts-adaptation/southwest.html
[4] McCabe, G.J., Palecki, M.A., and Betancourt, J.L., 2004, Pacific and Atlantic Ocean influences on multidecadal drought frequency in the United States: Proceedings of the National Academy of Sciences, v. 101, no.12, p. 4136–4141.

POLICIES

4. The County will actively participate in regional, cross-jurisdictional water resources planning efforts (such as the CPWAC&WP) that address how future human demands will be met without compromising the ecological integrity of the natural systems and wildlife habitat that rely on surface and groundwater. These efforts should also address water conservation and reuse.

5. Long-term water planning efforts supported by the County will incorporate climate science into projections of future supply.

6. The County will promote the dissemination of information to current and future residents regarding the status of water resources for domestic use.

WATER SOURCES

ADWR identifies four categories of water supplies currently available in Arizona: groundwater, ***surface water***, ***reclaimed water*** (treated wastewater), and the Colorado River (*see the maps at the end of this chapter*). The primary source of water in Coconino County is groundwater, although some surface water is used. Reclaimed water is becoming an important source for nondrinking purposes. Colorado River water is classified separately because of the complex legal issues that involve many states and jurisdictions. Currently, the only entities in the county that draw water directly from the Colorado River are the City of Page, some communities in the Navajo Nation, and the Navajo Generating Station (NGS).

Gray Mountain water tank mural.

Surface water reservoirs such as Upper Lake Mary near Flagstaff and the Santa Fe Reservoir near Williams historically supplied a significant portion of the drinking water for these cities. However, drought conditions beginning in the 1990s have diminished these sources and made them less predictable, leaving Flagstaff and Williams more reliant on groundwater sources. The City of Flagstaff, for example, now obtains about 70% of its water supply from wells in the surrounding area, including the Inner Basin of San Francisco Mountain[5]. The City of Williams is currently in a water crisis and has recently drilled four deep wells (around 2,750 feet) in an attempt to supplement its surface water supplies. Small surface-water impoundments are also important sources of water for livestock and wildlife across the county. However, precipitation is often insufficient to fill these tanks, so ranchers and wildlife managers often haul water from groundwater sources to support livestock and wildlife.

Almost all domestic water in Coconino County is provided by centralized water distribution systems, hauled water systems, or individual wells. These systems primarily rely on groundwater from deep ***aquifers*** as the source of supply. Communities throughout the county are either currently recharging aquifers with reclaimed water or are exploring ways to do so. Regional aquifers vary in depth and age (up to several thousand years old). They are recharged when rain and snow ***percolate*** downward from the surface and flow along fractures in the bedrock, sometimes over great distances; for example, some ***springs*** that ***discharge*** along the Colorado and Verde Rivers originate 70 miles or more away. Because of this connectivity, groundwater pumping at one location can affect water

[5] Flagstaff Regional Plan 2030, City of Flagstaff. http://www.flagstaff.az.gov

Left: Oak Creek spring. COCONINO COUNTY ENVIRONMENTAL QUALITY
Right: Hopi Resources Program tour of a restored Hopi spring. COCONINO COUNTY COMMUNITY DEVELOPMENT

levels in an entirely different geographical area or jurisdiction over time. Given the interconnected nature of groundwater systems, it is critical that water supply planning is conducted on a regional basis and that it involves incorporated and unincorporated communities as well as state, federal, and tribal resource management agencies.

The most reliable groundwater resources in Coconino County occur in a series of layered aquifers within rock formations between 500 to 3,000 feet below the surface. The three primary aquifers that provide groundwater in the county are the N aquifer (Navajo Sandstone), the C aquifer (Coconino Sandstone), and the R-M aquifer (Redwall and Muav Limestones; see maps at the end of this chapter). Of these, the R-M aquifer is the deepest and the only one that underlies the entire county. The N aquifer has historically been a source of domestic, municipal, industrial, and livestock water use for the Navajo Nation, the Hopi Tribe, and the Community of Fredonia. The C aquifer is the main source of municipal water for the larger communities and developments in southern Coconino County. The R-M aquifer, because it is so deeply buried, is only beginning to be developed for domestic and municipal supply at smaller communities such as Williams, Valle, Supai, and Tusayan.

Through springs, these aquifers supply the perennial flow for all of the region's major rivers and creeks. The R-M aquifer feeds springs in the Grand Canyon and Havasupai as well as perennial flows in several major tributaries, including Bright Angel Creek and the Little Colorado River. At the southern end of the county, the C aquifer feeds Oak Creek, Sycamore Creek, East Clear Creek, and others. These creeks and their associated riparian areas are vital to supporting the region's wildlife and plant diversity, including 18 of the 27 federally endangered plants and animals that live in the county. Eleven of those 18 species are fish, with very specific habitat needs. Localized aquifer drawdown is already occurring in some areas, with the potential to cause a loss of habitat for aquatic species [6, 7]. Increasing

[6] Leake, S.A., J.P. Hoffmann, and J.E. Dickinson. 2005. Numerical Ground-Water Change Model of the C Aquifer and Effects of Ground-Water Withdrawals on Stream Depletion in Selected Reaches of Clear Creek, Chevelon Creek, and the Little Colorado River, Northeastern Arizona: U.S. Geological Survey Scientific Investigations Report 2005-5277, 29 pp.
[7] Papadopulos, S.S. and Associates, Inc. 2005. Groundwater flow model of the C Aquifer in Arizona and New Mexico. Prepared for the Salt River Project and Mohave Generating Station Co-Owners. S.S. Papadopulos & Associates, Inc., Environmental & Water-Resources Consultants, Bethesda, Maryland. 35 pp. + Appendices

water demands and changing climate are the drivers that could reduce flows to these waters and jeopardize the species that rely on them. Careful, comprehensive water resources planning and oversight will be needed to safeguard against such potential outcomes.

The use of reclaimed water has become an important to conserving groundwater in Coconino County *(see the maps at the end of this chapter)*. Page, Williams, Sedona, and Flagstaff all use reclaimed water to irrigate golf courses, public parks, and school grounds. In recent years, large subdivisions have begun using their reclaimed water for similar purposed. Reclaimed water use is discussed in more detail in "Water Conservation and Alternative Sources" below.

WATER QUALITY

The quality of surface water in Coconino County's rivers, creeks, lakes, and reservoirs is generally very good. The ***Arizona Department of Environmental Quality (ADEQ)*** monitors surface water in a small network of fixed stations. Most of these waters meet drinking water standards that are based on *Clean Water Act* criteria and/or standards established by the State of Arizona. The surface water used by Flagstaff and Williams typically only requires filtration, the standard treatment process, to reduce dissolved sediment and chlorination to prevent bacterial contaminants.

The quality of the county's ***groundwater*** varies from excellent to very poor, depending on the aquifer and its location. Typically, the quality of groundwater in the N aquifer is excellent wherever it is encountered. Groundwater quality in the C aquifer is generally excellent in the southern parts of Coconino County but degrades northward because of salt dissolution from the bedrock. To the north and east of Wupatki National Monument and Leupp, groundwater from the C aquifer is generally not fit for human consumption but is still usable for livestock. The quality of groundwater in the R-M aquifer is poorly understood. Excellent quality water has been developed from this aquifer in the Williams, Valle, and Tusayan areas as well as on the Havasupai Reservation. However, a few wells drilled in the Williams and Havasupai areas have encountered very poor quality water in the R-M aquifer.

Avoiding point- and ***nonpoint-source pollution*** will help protect our aquatic ecosystems and our surface and groundwater quality. Point sources of pollution typically originate from industrial discharges (atmospheric, solid, or liquid waste). This type of pollution is regulated by the ***U.S. Environmental Protection Agency (EPA)*** and ADEQ. Nonpoint pollution can be a problem in areas of high development, recreational use, or livestock use. The most common nonpoint source pollutants are sediment, animal waste, fertilizer, and motor oil, which wash into waterways during storm events.

The County's *Stormwater Ordinance* is designed to minimize nonpoint pollution to our waterways and drinking water. The intent behind this ordinance is to slow down stormwater, allow it to infiltrate into the ground, and protect riparian and floodplains from pollution. ***Low impact development (LID)*** designs provide tools such as swales, detention basins, and pervious pavement to retain stormwater on site. Resources such as the

City of Flagstaff's *Low Impact Development Guidance Manual* provide practical guidance on these methods.

Another important factor contributing to water quality is watershed health. Forest restoration and the prevention of high-severity wildfire are critical to our watersheds. In 2012, Flagstaff residents approved a $10 million bond to restore forests in two key watersheds. The goal of this work will be to reduce fuels to prevent severe wildfires and impacts of the resulting flooding on Flagstaff's water supply. More forest restoration efforts are needed and will depend on successful initiatives such as the Four Forest Restoration Initiative (4FRI). The best way to protect watershed health is to minimize disturbance to native vegetation and soils. Land use activities should minimize soil disturbance; likewise, riparian areas and floodplains should be protected because they provide important buffers between upland uses and instream water quality.

Concerns are often raised about the impact of septic systems on groundwater. Coconino County has worked diligently over the last 10 year to decommission cesspools and update old septic systems. Typically, in order to filter out pathogens before they reach groundwater, septic systems should have a minimum soil depth of at least 4 feet between the leach field and an impermeable layer or a minimum of 5 feet between the leach field and a saturated (water) zone. Nitrates are potentially of higher concern because heavy rains could leach them into aquifers, particularly in areas containing loose cinders or faults. However, ADEQ monitors nitrate levels regionally and has not yet identified any areas within Coconino County that require mitigation. Recent studies (both national and local) have shown that EPA water-quality standards (A or A+ water) for discharging reclaimed water still allow some organic and pharmaceutical compounds to pass into our waterways and that these compounds can percolate to groundwater. These chemicals have documented effects on aquatic organisms[8]. Their potential impact on humans has yet to be thoroughly studied.

In a few areas—most notably the Fort Valley, Bellemont, Pittman Valley, and Parks communities—groundwater occurs close to the surface in perched water-bearing zones. Because this shallow water is more susceptible to impacts from septic systems and other surface contamination, it should be tested or treated periodically to ensure safety. Also, these perched water tables are closely tied to annual precipitation; as a result, long-term supplies from them may be less secure.

GOAL

Coordinate with state, federal, and local resource management agencies to ensure sustainable management practices that preserve and improve the quality of surface water and groundwater.

POLICIES

7. Conserve and enhance riparian buffers, protect floodplains from development, and require the capture of stormwater on site.

8. The protection of surface water and groundwater quality shall be a factor in the consideration for approval of all developments.

9. The County supports forest restoration projects and will act as a collaborator to protect watershed health throughout the county.

[8] Wolff et al. 2015. Estrogenic environmental contaminants alter the RNA abundance profiles of genes involved in gonadal differentiation of the American bullfrog. Science of the Total Environment 521-522, pg.380-387.

10. Development proposals that will affect drainage on adjacent properties, roads, or watercourses shall include a drainage plan that addresses the impacts and mitigation measures affecting water quality and flooding.

11. To reduce stormwater runoff and improve water quality, the County encourages minimizing impervious surfaces and using LID principles within all developments.

12. The County shall set an example of responsible water resource protection by locating its new buildings, roads, and other facilities in such a way as to protect surface water and groundwater quality and through the implementation of LID principles.

Left: Valle water tanks.
Right: Water station in Bellemont.

WATER PROVIDERS

Unlike many incorporated cities and towns, Coconino County does *not* provide water to its residents. County residents obtain their water in a variety of ways, including domestic water improvement districts, owner cooperatives, community water systems, shared wells, individual wells, and hauling. As of 2014, the county had six domestic water improvement districts: Forest Lakes, Kachina Village, Foxboro Ranch, Valle, Majestic View, and Badger Creek. Water improvement districts are formed by area residents to raise money so they can manage or develop a system. They provide a mechanism for improving water security and quality for residents while helping the County and its partners assess and plan more comprehensively for the future. Doney Park Water is the only owner cooperative in the county. In that case, customers are members and an elected board of directors and staff run the operation. In some areas, particularly subdivisions, individual lot owners have developed a private system of shared wells. Although shared wells can significantly reduce the costs of drilling and maintenance for owners—potentially allowing them reach deeper and more reliable aquifers—they do not reduce the use of groundwater resources. Clear Creek Pines, Forest Highlands, and Flagstaff Ranch are examples of a ***subdivision*** where owners have worked together to develop a well, storage infrastructure, and line extensions for a limited number of homes. Springs provide water in some areas, most notably Oak Creek Canyon, parts of the Navajo and Hopi Reservations, the Havasupai Reservation, and the Arizona Strip.

Hauling water is also a common practice among residents of unincorporated and remote areas. Typically, these residents access standpipes for bulk water sales by coin or card. Some residents haul their own water; others use commercial haulers. These bulk standpipes are provided by a variety of entities across the County—water districts, owner

Rainwater harvesting systems treated for domestic use.
COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

cooperatives, shared wells, private water systems, and municipalities. Residents who rely on hauled water are the best conservers but they may also be the most vulnerable to future shortfalls since they have no established water rights. Additionally, some municipalities that sell water have adopted policies that would restrict sales to external users under drought conditions.

GOAL

Provide guidance to residents, water providers, and potential water districts to help them develop sustainable supplies that are consistent with local and regional needs.

POLICIES

13. The County shall provide guidance to communities in the formation of water districts.

14. The County shall work with other jurisdictions to secure sources of hauled water during times of drought.

WATER CONSERVATION & ALTERNATIVE SOURCES

Between 2000 and 2013, population grew by about 1% per year in Coconino County[9]. If growth continues at that rate, demands on our water supplies will continue to increase. The Bureau of Reclamation's (BOR's) *Report of Findings for the North Central Arizona Water Supply Study* (2006) projected an unmet demand for water of about 25,000 acre-feet (AF) by the year 2050 (25% more than the amount used today). Although developing additional water sources will be crucial, immediate and cost-effective alternatives should also be used to meet these demands. The County can play an important role in educating users and incentivizing water conservation. For example, rate structures have a large influence on water use. The County can work with providers to restructure water rates to incentivize household conservation. Residents can take many steps to reduce their consumption, such as using low-flow plumbing devices, drought-tolerant ***landscaping***, and alternate watering schedules, as well as using sources such as reclaimed water, ***gray water***, rainwater, and stormwater for nonpotable purposes. In fact, these alternative sources could be used at a larger scale for landscaping, agriculture, golf courses, parks, and some commercial/industrial purposes. The County also supports the development of technologies to use these sources for a broader range of needs, including potable uses.

[9] US Census. 2015. www.census.gov

EDUCATION & OUTREACH

The County can continue to promote water conservation and alternative water sources in a variety of ways. Educating the public, developers, and County staff is important. We already help incorporate conservation elements into development projects and encourage the use of reclaimed water, gray water, and rainwater systems. Currently, the County offers free consultation and resources for implementing water conservation in new and existing development through its Sustainable Building Program and the *2001 Landscape Ordinance*. The ordinance is based on xeriscape principles that require new, nonresidential development to use native and/or drought-tolerant plants, based on geographic location. Another way the County promotes water awareness and conservation is through regional partnerships and programs such as CPWAC's Public Outreach Program. New technologies are constantly emerging that can help us reduce our consumption of this precious resource.

250 gallon barrel for collecting rainwater.

RECLAIMED WATER

The grading system (A+, A, B, and C) for reclaimed water originating from community wastewater systems indicates if and how it can be used or returned to the environment. Using reclaimed water for landscaping and other purposes conserves not only groundwater but also the energy required to pump it. The Cities of Page, Williams, Sedona, and Flagstaff all use their reclaimed water to irrigate golf courses, public parks, and school grounds. Flagstaff's reclaimed water is also used to make snow for skiing, and some is discharged into the Rio de Flag to support riparian habitat (per an agreement with the ***Arizona Game & Fish Department***). The projected demand for reclaimed water in Flagstaff will exceed the available supply. The City of Tusayan is retrofitting homes for the use of reclaimed water for nonpotable domestic purposes to avoid the expense of drilling and developing groundwater from depths of over 3,000 feet below the surface.

At this time, most of the reclaimed water use in the county is within incorporated communities. However, subdivisions that provide community wastewater treatment are also good candidates for developing the resource. For example, the Forest Highlands Water Company uses all its reclaimed water to irrigate its golf course and holds an agreement with the Kachina Village Improvement District to purchase its excess reclaimed water if ever available.

GRAY WATER

Gray water is defined as wastewater that is collected separately from sewage and originates from clothes washers, bathtubs, showers, or sinks, but not from a kitchen sink, dishwasher, or toilet. Reusing gray water domestically is a simple way to reduce groundwater extraction. In 2001, ADEQ adopted regulations that allow residential users to reuse gray water from their household for the beneficial watering of landscape. This program is managed by the Coconino County Community Development Environmental Quality Division (CCCD-EQ). Residents wishing to construct a gray water reuse system should work with the Coconino County Community Development Department to meet sanitation and aquifer protection requirements.

RAINWATER HARVESTING

Rainwater harvesting is capturing roof ***runoff*** and storing it for domestic or landscaping use later. Using rainwater for nonpotable uses is straightforward and, at times, incentives have been available for 1,000-gallon-or-more tanks and other rainwater harvesting systems. Rainwater capture for potable use is possible, but there are serious health risks if not properly managed. Standard construction materials typically do not conform to the

specifications of the American Water Works Association, which ensure satisfactory quality water for human consumption. Also, the sanitation risks associated with rainwater harvesting include wildlife and vector contamination. Just as with domestic wells, residents should test their potable sources periodically to ensure that they meet ADEQ potable water standards. Grand Canyon National Park Airport is noteworthy because it harvests potable water via its rainwater collection system, which includes a 3-million-gallon tank to store untreated water.

STORMWATER CAPTURE / LOW IMPACT DEVELOPMENT

LID has blossomed across the country in recent years because multiple benefits are gained by capturing stormwater on site. These include the ability to augment water to desirable plants, reduce downstream erosion, protect riparian and river quality, reduce damage to water conveyance structures, and increase groundwater recharge. The City of Flagstaff has developed several large and small bioremediation and detention basins in recent years that have mitigated flooding and reduced pollution to the Rio de Flag. LID concepts are also promoted through City ordinances and programs that encourage simple and cost-effective structures such as swales in yards to contain rainwater on site. The County encourages these practices because of the benefits to soils, waterways, and groundwater.

GOAL

Promote water conservation practices that include new technologies and methods to reuse water.

POLICIES

15. The County encourages and supports water conservation measures by both water providers and consumers and promotes the use of such conservation tools as water-saving plumbing fixtures and environmentally sound water harvesting systems in all new development and retrofits.

16. Water conservation should be a consideration for the approval of all developments, and high-efficiency, low-net volume water use is encouraged.

17. Educate the public about water sources, water scarcity, water conservation issues, and pertinent scientific studies.

18. The County shall strongly encourage individual homeowners and businesses to reduce water consumption, use low-impact development and erosion control strategies, and reuse reclaimed water.

19. The use of reclaimed water and gray water will be encouraged wherever possible as permitted by State law.

20. Continually evaluate regulations to ensure they allow for and facilitate best practices related to water conservation.

21. The County shall set an example in new and existing County facilities by implementing best practices for water conservation techniques.

22. In conjunction with considerations for dust control, drainage, and maintenance, the County supports alternative paving methods that mitigate the impacts of surface-water runoff and conserve water by promoting aquifer recharge.

23. The County supports the use of rate structures and other incentives to encourage water efficiency and conservation.

Ashurst Run on the Flying M Ranch. JOHN ABER

Land Use & Growth

INTRODUCTION

Land use patterns in Coconino County have been shaped not only by plans, ***zoning***, and ***subdivision*** regulations, but also by physical factors such as topography, water availability, and infrastructure. Other contributors to the existing land use patterns include land ownership, railroad lines, tourist attractions, ***State Trust land***, and large land holdings by other jurisdictions including federal agencies and Native American tribes. Future development is affected by these historic patterns as well as by transportation corridors, population trends, employment growth, infrastructure, services, and water availability.

This chapter reflects the guiding principles of the *Coconino County Comprehensive Plan*; it addresses existing and future land uses, recognizes the need for ***conservation*** of land as part of the development process, and promotes the use of ***integrated conservation design*** and other ***Smart Growth*** concepts to ensure the county's long-term viability.

As Coconino County plans for future growth, designated activity centers provide opportunities for residential, commercial, and industrial development within communities. Promoting a mixed-use approach not only helps create a range of employment opportunities and a stable economy, but it also provides opportunities for a variety of housing choices and a multimodal transportation system rather than one dependent on automobiles.

Designating areas for more intensive activity is intended to promote responsible growth that offers residents a range of choices, minimizes the environmental impacts of that growth, reduces the cost of infrastructure and services, and ensures capacity to support future generations.

The policies in this chapter support new development that not only follows available and planned infrastructure, utilities, and services but is also balanced with the available water supply. The policies are meant to promote a range of housing choices, use land resources more efficiently, and conserve environmentally sensitive features, while identifying locations that are appropriate for development. They protect the ***natural environment*** and the character of our communities.

Methods for achieving these goals include:

- Promoting orderly, concentrated growth in or near existing communities with appropriate levels of infrastructure and services in place
- Giving preference to projects that include redevelopment, ***infill***, and higher-density development within existing communities
- Using integrated conservation design strategies to reduce and mitigate the impacts of new development
- Wisely using State Trust and federal lands
- Ensuring that impacts to services and infrastructure from any new development are adequately covered by developers
- Maximizing the efficiency and effectiveness of the County's ***Capital Improvement Plan (CIP)*** as a mechanism to guide development

This chapter is divided between two purposes:

- A description of the existing land use conditions in Coconino County
- Smart Growth strategies that can respond to these conditions

EXISTING LAND USE CONDITIONS

Physical Characteristics & Ownership Patterns

With 18,619 square miles (nearly 12 million acres), Coconino is the second largest county in the U.S. and the largest in Arizona, but it is also one of the most sparsely populated. It is characterized by rugged mountains, deep canyons, and thick forests of pine, spruce, and piñon, aspen, and oak. Within its borders are many scenic sites; the most popular is the Grand Canyon. Other attractions include Vermilion Cliffs National Monument, Oak Creek Canyon, Sunset Crater Volcano National Monument, Wupatki National Monument, Walnut Canyon, Navajo National Monument, San Francisco Mountain (Arizona's highest point at 12,633 feet), and Lake Powell (with 1,960 miles of shoreline).

Within the unincorporated portions of the county, only 12% of the land is privately owned. Native American tribes also own approximately 39% of land within the county, both on and off reservation. County regulatory authority applies to tribally owned lands off the reservation (***fee simple lands***) but not to reservation lands (***tribal trust lands***). The following tribes own land within Coconino County: Navajo Nation (27%), Hopi Tribe (5.6%), Hualapai Tribe (4.9%), Havasupai Tribe (1.5%), and the Kaibab Tribe (0.1%). The federal government owns and manages more than 39% of land within the

county. The primary managers of this federal land include the ***U.S. Forest Service (USFS)*** (27.3%), ***National Park Service (NPS)*** (6.7%), ***Bureau of Land Management (BLM)*** (5.1%), and Department of Defense (0.2%). State agencies control the remaining 9.5% of the land, of which the ***Arizona State Land Department (ASLD)*** owns 9.4%. Nearly three-quarters of the private land in Coconino County consists of large ranches.

A summary of the tribal, incorporated, and unincorporated communities in Coconino County can be found in "Appendix A: Places of Coconino County."

Influence of the Flagstaff Regional Plan, Area Plans, & Rural Planning Areas

Planning occurs simultaneously at the regional, county, and local levels. Agencies such as the ASLD, USFS, BLM, and NPS develop plans for managing their lands. For example, the ASLD coordinates with jurisdictions on general and comprehensive planning efforts.

In 2013, the ***Flagstaff Regional Plan 2030*** was completed and adopted by both the Flagstaff City Council and the Coconino County ***Board of Supervisors (BOS).*** This is a regional plan as well as the general plan for the City of Flagstaff. The plan applies to the City of Flagstaff but also to an area of about 460 square miles of the unincorporated county known as the ***Flagstaff Metropolitan Planning Organization (FMPO)*** boundary (*see the County Area Plans with FMPO Boundaries map at the end of this chapter*). Like this *Comprehensive Plan*, the *Regional Plan* contains goals and policies to guide growth. Its themes of concentrating development and protecting ***open space*** are consistent with those of this plan. Within the FMPO boundary, the *Regional Plan* established ***rural growth boundaries*** around some of the private land currently under County jurisdiction and within existing County-adopted ***area plans***. These area plans are quite large; the rural growth boundaries established by the *Regional Plan* include portions of, but may not include all of, the following County-adopted area plans:

- *Doney Park / Timberline / Fernwood Area Plan* (adopted 2001)
- *Fort Valley Highway 180 Corridor Area Plan* (adopted 2011)
- *Kachina Village Area Plan* (adopted 2009)
- *Mountainaire Area Plan* (adopted 1991)
- *Bellemont Area Plan* (adopted 1985)

To date, the BOS has adopted nine area plans and one ***Rural Planning Area*** plan. In addition to the five listed above, the following area plans located in the county outside of the FMPO boundary have also been adopted by the BOS:

- *Parks Area Plan* (adopted 2001)
- *Valle Area Plan* (adopted 1999)
- *Red Lake Area Plan* (adopted 1992)
- *Oak Creek Canyon Area Plan* (adopted 1989)
- *Diablo Canyon Rural Planning Area Designation* (adopted 2005)

As an official amendment to the *Comprehensive Plan, an area plan holds the same weight and authority as the Comprehensive Plan*. It reflects the local residents' vision of the future for their community/neighborhood/area. Some area plans include a ***design review overlay zone*** to help developers and the County integrate new commercial, industrial, and

multifamily development projects into the fabric of the existing community. All area plans contain goals and policies for future development, focusing on the unique concerns of the community. These plans can address specific neighborhoods, local roads, community character, and land uses. Zone changes and conditional use permits must be consistent with the goals and policies of both this *Comprehensive Plan* and the applicable area plan (*see the County Area Plans with FMPO Boundaries map at the end of this chapter*).

Additionally, the *Regional Plan* identified the potential for ten ***rural activity centers*** and one suburban activity center within the FMPO boundary in areas currently under County jurisdiction. Most, but not all, of these rural activity centers coincide with an area plan previously adopted by the County. For example, the *Regional Plan* identified the potential for four rural activity centers in the *Doney Park / Timberline / Fernwood Area Plan* and one each in the area plans for Kachina Village, Fort Valley Highway 180 Corridor, Bellemont, and Mountainaire. Additionally, the regional plan also identified activity centers in areas where a county area plan has not been established in the Townsend/Winona area (rural) and Flagstaff Ranch Road area (suburban). Four identified activity centers within Flagstaff city limits could potentially impact County jurisdictional areas. If these areas are to grow as activity centers as identified by the *Regional Plan*, area and or master plans should be established to guide coordinated and strategic development.

For areas that fall under more than one planning document, development should comply with all plans equally. No one plan supersedes another in terms of importance. This *Comprehensive Plan* honors all goals, policies, and growth illustrations of the *Regional Plan* as adopted by the BOS.

COCONINO COUNTY LAND USE ISSUES

Rural Character

Many residents of unincorporated communities within the county share strong beliefs about conserving its ***rural character***. Each resident defines "rural" differently and desires different levels of amenities. "Rural" is a highly revered term because it often equates to personal freedom, and residents are often concerned that nearby higher-density development will negatively affect their lifestyle. The *Coconino County Comprehensive Plan* strongly emphasizes ***integrated conservation design***, which encourages more efficient land use through shared open space and smaller lot sizes or ***cluster development***. The County's ability to implement conservation design depends on residents' willingness to change their perception of rural character from one that favors 2.5- and 5-acre lots with no ***open space*** to one that embraces smaller individual lots with larger areas of conserved open space.

Gated Communities & Public Access

Buyers seek gated communities for reasons related to security, sense of place, and unique community features. They typically demand a lower level of public services than other types of development. They fill a market demand and niche. However, as with most issues, gated communities have pros and cons. Walls and barriers affect viewsheds, rural character, and sense of community. Additionally, having access to open space and landscapes is a unique and important attribute of Coconino County and an intrinsic value of the rural lifestyle. Developments adjacent to such places should retain physical ***access*** for public use to these open spaces and landscapes. For this reason, gated communities are cautioned that in Coconino County they will be required to maintain public access to these lands, provide multimodal and infrastructure connectivity to other subdivisions,

connect neighborhood ***trails*** to community and regional trails, and mitigate viewshed and character impacts.

Inholdings

Inholdings present additional challenges for development. There are three major classifications of inholdings with the county:

- Those surrounded by public lands such as national forest or national park, which tend to have a high value as low-density or open space
- Those surrounded by tribal lands, where different laws, such as the prohibition of alcohol sales, are not applicable to developments on the inholding
- Those within incorporated areas such as two county islands within the City of Flagstaff where signage, lighting, design, and use allowances differ from the neighboring properties

Because the County must treat all properties of the same zoning classification similarly, it can be difficult to prevent such incompatible uses or standards on inholding properties. Outreach to the surrounding property owners early in the process is critical so that they can work with proposed inholding developments to work towards compatibility with the surrounding jurisdictions' plans and regulations.

Rural development in Doney Park.

heckerboard Development

The majority of private ownership of land within Coconino County is a checkerboard configuration with State Trust lands. Currently, much of this land is used by ranchers for grazing, a use that benefits the county by providing unfragmented open space and wildlife habitat. In ***checkerboard areas***, when alternating private sections are developed for residential purposes, the potential for selling the adjacent State Trust land sections can increase. However, the ASLD follows a *Five-Year State Trust Land Dispositions Plan* (required under the *Arizona Growing Smarter Act*) that guides the identification of lands under consideration for disposition. Under these plans, sales and leases are targeted in

Development in Fort Valley. JOHN ABER

growing urban markets with access to municipal services including water and wastewater service. Although ASLD does not normally target rural lands for disposition, it does maintain the authority to sell these lands. The pressure to do so could mount when these sections no longer generate revenue from grazing leases, when they become difficult to manage, or when the number of access roads to the intervening private sections increases. Should the ASLD decide to dispose of its land to benefit the trust, or a ranch owner elect to sell off portions of their ranch for other uses, the integrity of these unfragmented ranchlands can be lost. This reinforces the need to support working ranches and work with the ASLD to retain priority open-space parcels for conservation.

Lot Split & Wildcat Subdivisions

State law allows property owners to ***lot split*** property up to five ways without subdivision review and approval. Successive owners may also split, provided the resulting parcels are not smaller than the minimum size required by the zoning. Consequently, many areas are developing through this lot-split process rather than going through the planning process for subdivisions. The results are whole areas (or "***wildcat subdivisions***") with minimal roads and utility improvements, no open space, habitat fragmentation, and the potential for drainage issues. Unfortunately, in Coconino County the number of parcels developed through lot splitting exceeds those approved through the subdivision process.

State law also allows owners to divide land into parcels of 36 acres or more with no County oversight, although they must record a plat and submit a public report. These developments are commonly referred to as ***40-acre ranchettes***. The most common zoning district within the county is the General (G) Zoning District, which allows for a 10-acre minimum lot size; therefore, each 40-acre parcel could be divided into four lots without the need for a subdivision being recorded or a rezoning. At present, the County's

Subdivision Ordinance provides for very limited authority to oversee lot splits where resultant parcels exceed 10 acres.

Counties in Arizona have long desired greater control over lot splits so they can address issues related to roads, utilities, and proper drainage, which are often substandard. Residents perceive several advantages to lot-split development: the ability to maintain an area's rural character and low population density, shorter time frames for approval and, in some cases, lower initial land costs. Most problems related to lot splits involve roads. Neighbors may feud over easements, maintenance, drainage issues, and traffic. In addition, lot splits often fragment wildlife habitat, offer no opportunity for preserving open space, and disregard topography and other building constraints such as ***floodplains***. The County Planning & Zoning and Code Compliance Divisions spend a significant amount of staff time and resources fielding and investigating complaints on issues related to access and boundary disputes. Overwhelmingly, these complaints come from property owners of these lot-split parcels and wildcat subdivisions. Because these parcels were developed in this manner rather than through the subdivision process, the County often cannot mitigate the situation. Often the only resolution for these property owners is in civil court—a fact that does not make most property owners happy or satisfied with their County offices.

The County should pursue amending the law or upgrading standards for lot splits. The goals of such changes should be to provide better access for emergency vehicles, reducing problems related to dust and drainage, and protecting rural character, ecological integrity, and property values. Options include strengthening road standards, overseeing easements to ensure proper drainage, requiring road maintenance agreements, and providing incentives for good planning through integrated conservation design.

Paper Development

During the last few decades, and particularly in the most recent housing boom, platted subdivisions or land divisions occurred without eventual development. These entitlements remain, posing an issue: The conditions under which they were platted may be far different and substandard to what would be required when development finally does occur. While this trend is not historically unusual, the problem has intensified as a result of the 2008 recession and consequent downturn in the real estate market.

If the County does nothing, build-out will continue at low densities until private land is no longer available. If this occurs and the County has not improved this situation, the remaining entitlements will prevent the County from pursuing Smart Growth strategies in these areas.

Second Home Ownership

Approximately 20% of all homes in Coconino County, in both incorporated and unincorporated areas, are used for seasonal occupancy. In the unincorporated areas of the county, the percentage of second homes is much higher. In Kachina Village and Mountainaire, for example, second homes comprise about one-quarter of all residences; in Pinewood, about 80%; and in Blue Ridge and Forest Lakes, nearly 90%. As the Phoenix metropolitan area continues to grow, the demand for seasonal homes will continue to be strong. Additionally, many people are buying retirement homes well in advance of their retirement and using them as second homes, vacation rentals, or long-term rentals in the meantime. This use, while supporting a growing sector of the tourist industry, may have unintended impacts such as changing the character of some neighborhoods and communities and affecting affordability.

Nonconforming Uses

A ***nonconforming use*** is one that was legal prior to 1964, when the *Coconino County Zoning Ordinance* was adopted or prior to the adoption of an amendment or change in zoning classification. According to state law, nonconforming uses can exist indefinitely. Many nonconforming lots that do not meet current minimum lot sizes were created prior to 1964 or 1981, when a new *Zoning Ordinance* was adopted. These lots are legally entitled to building permits. Every amendment to the *Zoning Ordinance*—more than 60 since its adoption in 1981—has the potential to create a new set of nonconforming situations. For example, when the ordinance was amended in 1986 to prohibit new billboards, all existing billboards became legally nonconforming. Other nonconforming uses include ***manufactured home*** parks in single-family residential zones, commercial uses such as RV parks in residential zones, single-family residences in commercial and industrial zones, and manufactured homes in zones that allow only site-built homes. Owning a nonconforming property has financial implications for property owners. It may be hard to secure lending on such properties and ***conditional use permits*** may be required for extensive repairs or remodeling. Because such uses are allowed to continue indefinitely, the County processes numerous requests to improve, enlarge, or alter them. And although the *Zoning Ordinance* encourages removing nonconforming uses or bringing them into compliance, this may not always be possible or economically viable. Additionally, many of these uses have historic value. Discerning between which uses have value while continuing to bring other uses, such as billboards, into compliance with code can pose challenges.

Housing Affordability

There has been considerable discussion about the County's role in providing ***affordable housing***. Many factors contribute to the cost of homes. Large lot zoning has resulted in higher land prices, and development costs have increased because easily accessible lands have already been developed. In addition, the cost of installing utilities and infrastructure such as wells and on-site wastewater treatment systems is high. Although land in more remote areas can be less costly than land in an established community, the long-term costs of utilities, community services, and transportation from a rural location to an urban employment center, for example, can often be greater than any initial savings. In general, the provision of County services becomes more costly as one moves away from developed communities, ultimately decreasing the potential to provide affordable housing. Concentrating development can help decrease the costs of providing services and infrastructure and improve housing affordability.

The County has promoted housing affordability via land-use planning mechanisms such as amending the *Subdivision Ordinance* to decrease the minimum required street width and simplify the subdivision process. Other approaches have included encouraging higher densities, clustered subdivisions, and locations for manufactured homes.

Allowing accessory units for rental would also help make owner-occupied housing more affordable, and long-term rental could provide additional housing opportunities for residents. Designing accessory units that are clearly subordinate to the principal dwelling would maintain the residential character of the area and therefore eliminate the need for a zoning change.

Updates to the *Zoning* and *Subdivision Ordinances* will further consider this issue.

Military Installations

The U.S. Naval Observatory and Camp Navajo are two military installations that provide tremendous value to our national security and local economy. The County is well aware of the potential threats that new development and changes in land use can have on the mission of these installations. As the economy improves and new development is proposed for the greater Flagstaff area under County jurisdiction, the County sees the benefit of a coordinated, proactive, community-based planning effort to assess emerging threats, opportunities, and constraints. In 2015, the BOS supported several projects, including the Joint Land Use Study, to protect our mutual interests in areas surrounding or impacting the U.S. Naval Observatory Flagstaff Station and Camp Navajo. Through community involvement, the study would identify compatible and incompatible land uses regarding dark skies protection and strategic open space that are mutually beneficial as military buffers and resource protection.

Camp Navajo Entrance Gate.

The Naval Research Observatory and Camp Navajo have been seeking partners with whom they could work on acquiring State Trust land adjacent to their operations in the Centennial Forest. This property has high wildlife value and it would give their installations a buffer zone.

GOAL

Respond to the specific and varied land-use conditions found in Coconino County with creative policies and strategies that protect important community values.

POLICIES

1. Seek changes to Arizona statutes allowing for State Trust reform or some other form of legislation allowing for the exchange of State Trust lands.

2. Discourage gated communities unless connectivity and public access is provided and development is in conformance with other appropriate policies and applicable plans.

3. The commercial use of inholdings within the national forest and national parks is strongly discouraged and, when development of inholdings is proposed, the existing density should not be increased and the proposed development should use integrated conservation design methods.

4. The County supports changes to state law to give Counties greater authority over lot splits.

5. Development projects within inholdings should be consistent with land management plans and the character of surrounding lands.

6. Outreach to the surrounding jurisdiction should take place early and often when development is proposed on inholdings. Annexation by surrounding jurisdiction is supported to ensure compatible land uses.

7. The County encourages and supports property owners in the development of platted subdivisions rather than lot splits and seeks to update the ***Subdivision Ordinance*** to help incentivize design that is consistent with the ***Comprehensive Plan*** and area plans.

8. To eliminate land use or zoning conflicts, transition nonconforming uses to a conforming use and work to alleviate the negative impacts of nonconforming uses over time. When amendments to the Zoning Ordinance are adopted, thought should be given as to whether existing uses should be considered nonconforming or granted legal status.

9. The County encourages affordable housing efforts and it will work to create incentives through ***Zoning Ordinance*** revisions that would promote a variety of housing types as well as accessory rental units.

10. In order to protect and maintain the mission of the Department of Defense installations, the County values the findings of the Joint Land Use Study, and incompatible land uses affecting the mission of existing military installations shall be discouraged.

11. Revisit the viability of the existing yet undeveloped platted subdivisions to reassess development standards for future buildout and to consider using integrated conservation design to redesign the lots, roads, energy, water, and wastewater systems.

LANDSCAPES & OPEN SPACE LAND USES

Open space describes unfragmented, undeveloped land that provides scenic, ecological, and recreational uses. In many instances, open space is set aside for resource protection or conservation; it may be managed as forestland, ***rangeland***, or agricultural land. In other cases, land may be designated open space because it requires special management for hazards. Over three-fourths of the non-Indian reservation land within Coconino County is managed by the USFS, NPS, BLM, and ASLD. State Trust lands are not for public use. Maintaining controlled points of access has been an important ongoing management issue for these agencies. The benefits of preserving open space include protecting ***watersheds*** and water quality, minimizing ***habitat fragmentation***, providing recreational opportunities, and enhancing our quality of life.

The ***Arizona Preserve Initiative (API)*** allows State Trust lands with high environmental and open-space values to be temporarily reclassified for conservation while municipalities, counties, or other groups raise funds to buy the land. In 2010, the County conserved more than 2,250 acres **that included 1,400 acres of *wetlands*** at Roger's Lake using the API. In 2012 and 2013, the City of Flagstaff was able to purchase more than 2,500 additional acres at Picture Canyon and Observatory Mesa from the ASLD. While API has been effectively used to conserve open space in the county, as of 2015 there is no funding for the match program.

Open space can be acquired for conservation without being purchased by donation or acquisition on fee simple lands by developing a ***conservation easement***. Conservation easements allow landowners to retain their property but limit development rights in perpetuity. On private lands, they are obtained by donation or acquisition of development rights based on an appraised value agreed upon by the landowner. Federal tax benefits may be available to the landowner if the easement meets certain standards for open space, natural or cultural resource, or recreational values, and it is held by a qualified land trust or government agency. Conservation easements do not have to allow public access. They can include working farms and ranches to protect agricultural lands. Several land trusts working in Arizona came together to form the Arizona Land Trust Network to provide education and information related to conservation easements and land ***stewardship***.

An outstanding example of a conservation easement in Coconino County is the Cataract Ranch (south of Grand Canyon National Park). This easement is approximately 40,880 acres, with 34,480 acres held by the Nature Conservancy and 6,400 acres by the County BOS. These entities will permanently protect the landscape from mining activity, subdivisions, and other development while allowing grazing and livestock production to continue. Even though Coconino County has acted as an easement holder, it would prefer to have landowners work with local, qualified, nonprofit land trusts on future conservation easements and it supports efforts to establish a land trust in northern Arizona for this purpose.

Another method of protecting open space is allowing some portion of a landscape, rangeland, or ranch to be developed at a higher density to protect other portions. This strategy is a form of ***transfer of development rights (TDR)***. In 2005, Arizona amended its state statutes to authorize Counties to permit TDR through the adoption of an ordinance. The statute also allows for the transfer development rights to incorporated areas from the unincorporated county through an intergovernmental agreement. As of 2015, Coconino County has not adopted a TDR ordinance.[1]

GOAL

Ensure the conservation of open space for the environmental, social, and economic wellbeing of the county.

POLICIES

12. The County will work with private landowners, public land managers, tribal entities, and the ASLD to protect open lands for the purposes of maintaining scenic viewsheds, preventing fragmentation, preserving important wildlife habitat, conserving working lands, protecting watersheds and water resources, providing buffers from developed areas, and protecting environmentally sensitive lands.

13. Open-space zoning shall be maintained for federally owned or managed public lands, and when such lands become private through purchase or exchange, zoning changes for future development shall be in conformance with the *Coconino County Comprehensive Plan*, area plans, and other approved plans for adjacent public lands.

14. Coordinate efforts to maintain compatible uses next to lands managed as open space.

15. In order to protect open spaces and landscapes, the County supports the development of a TDR ordinance in coordination with other jurisdictions.

16. The County supports local land trusts.

RANCHLAND LAND USES

The intent of this land use category is for a rural lifestyle allowing for large ranches, agricultural grazing land, and an open environment. Virtually all the federal and State Trust land in the county, except land under NPS jurisdiction or designated as wilderness, is

[1] ARS §11-804 states: "In applying an open space element or a growth element of a comprehensive plan, a county shall not designate private or state land as open space, recreation, conservation or agriculture unless the county receives the written consent of the landowner or provides an alternative, economically viable designation in the comprehensive plan or zoning ordinance, allowing at least one residential dwelling per acre. If the landowner is the prevailing party in any action brought to enforce this subsection, a court shall award fees and other expenses to the landowner. Each county shall incorporate this subsection into its comprehensive plan and provide a process for a landowner to resolve discrepancies relating to this subsection."

JOHN ABER

used for cattle grazing. In addition, approximately three-quarters of the county's private land consists of large ranches used almost exclusively for grazing cattle. Less prevalent uses include sheep, horses, buffalo, llama, and ostrich ranching. Eleven ranch owners, with private land holdings exceeding 10,000 acres each, collectively own nearly 1 million acres. Nearly 80% of this is owned by the Navajo and Hopi tribes.

Ensuring the quality of the county's expansive ranchlands is important. The vast landscapes of rural Coconino County are significant not only for their economic, visual, and historical values, but also because they contain large areas of contiguous ***habitat*** that provides ***wildlife corridors*** and ecosystem services. Ranchers, as the stewards of the largest tracts of private land in the county, protect working landscapes for future generations when using environmentally appropriate range-management practices. Their stewardship is as important in ensuring habitat as the conservation of federal and State Trust lands. Grazing activity is rarely confined to privately owned ranchlands; rather, it extends to State Trust land leases and federal grazing allotments. Generally, the County would like to see most State Trust sections in rural areas remain undeveloped and leased for grazing or managed for conservation in conjunction with large ranches. Assuming that ranches are managed in a way that preserves environmental values, the best solution may be increasing the length of the leases. As of 2014, leases could be for no more than 10 years.

In Coconino County, ranchers are offered an additional method for long-term planning of their property. Ranch owners can petition the BOS to form a ***Rural Planning Area***, which provides a means of developing incentives to retain certain portions of the ranches for conservation while identifying income sources such as beef, tourism, wood products, and energy development. If a ranch contains State Trust land that may be under consideration for the creation of a Rural Planning Area for conservation, the rancher will need ASLD permission to include these lands in such a district. The Rural Planning Area concept was added to state statutes as part of the Growing Smarter legislation. In 2005, the Coconino County BOS approved Arizona's first Rural Planning Area: the 426,000-acre Diablo Canyon Rural Planning Area.

GOAL

Conserve working ranches, unfragmented landscapes, and the county's rural character.

POLICIES

17. The County will work with property owners using a variety of strategies to maintain working ranches as a viable method of land management to maintain open space and preserve landscape integrity.

18. Private, federal, and State Trust lands shall be considered in a regional context in order to preserve landscapes.

19. The County supports the development of Rural Planning Areas to provide coordinated and strategic planning for the long-term viability of ranchlands.

20. The County encourages alternatives to the conventional pattern of 40-acre lot development, using integrated conservation design methods or strategic sales of small portions of the overall property to retain ranching on the remainder.

21. Seek changes to Arizona statutes allowing for State Trust reform or some other form of legislation allowing for exchange of State Trust lands.

Timberline.

RESIDENTIAL LAND USES

Residential land uses fall into five categories that accommodate a range of densities as well as several development patterns that are typical within Coconino County:

- ***Ranchette Residential (0–0.1 du/ac):*** The intent of this land use is for a rural lifestyle with a range of densities from 10-acre lots to 40-acre ranchettes and larger, along with agricultural land uses that are related to rural living. This type of residential development tends to emphasize privacy and self-sufficiency over convenience and services.

- ***Rural Residential (0.1–1 du/ac):*** This land use is intended to accommodate low-density residential uses, with minimum lot sizes varying from 1 to 10 acres, as well as light agricultural uses that are related to rural living. Landowners may develop as large-lot, single-family, rural residential, or they may cluster development on smaller lots using integrated conservation design techniques to conserve open space, views, and natural habitat.

- ***Suburban Residential (0.2–10 du/ac):*** This land use is intended to accommodate single-family residential use within platted subdivision neighborhoods having lot sizes ranging from 5,000 square feet to 5 acres. Density will be based on the availability of adequate water, sewer, and roadway infrastructure, and the subdivision should be designed with connections to open space, parks, trails, and community services.

- ***Urban Residential (10–20 du/ac):*** This land use is intended to accommodate apartment and condominium complexes and will primarily be located in incorporated municipalities or in areas where a full range of urban services and infrastructure are available. It may also be appropriate for residential uses placed above commercial uses or within employment and rural activity centers.

- ***Planned Development:*** The County allows for master planned development through the rezoning process to provide flexibility, promote mixed use and cluster development, and encourage integrated conservation design that will result in sustainable developments.

Kachina Village in 1998 with Forest Highlands to the northwest. FILE PHOTO

Koch Field in 1998, Doney Park. FILE PHOTO

Most residential development in the county features 2.5- to 10-acre lots. This trend is likely to continue given the infrastructure costs associated with higher density. However, preferably the style and intensity of residential development aligns with surrounding character. It should be concentrated near developed areas and activity centers, progressing to lower densities as distance from those areas increases. Many residential areas near incorporated cities act as bedroom communities where most residents commute for jobs and/ or services. Having neighborhood commercial services in residential areas can reduce transportation needs and provide a sense of place. In remote areas with few services and limited infrastructure, density should remain very low and projects should provide high levels of open space and environmental sensitivity.

The ability to address development as a whole, rather than lot-by-lot, allows for higher-quality infrastructure, the creation of shared assets such as wastewater systems, and higher protections for the natural environment. To make the subdivision process advantageous, the *Subdivision Ordinance* needs to be modernized to include incentive-based standards.

GOAL

Ensure a range of housing choices in a variety of communities that are well designed in terms of character, natural environment, and availability of services.

POLICIES

22. The County encourages the design of subdivisions that protect environmentally sensitive features or special characteristics of the property.

23. Where infrastructure and services are limited, the County favors rural residential densities using clustered development near identified activity centers.

24. Very low-density (such as ranchette residential) uses shall be maintained in areas without water, utilities, and fire protection.

COMMERCIAL LAND USES

Commercial land uses are scattered throughout the county, historically on or near state highways or interstates. Most can be characterized as neighborhood commercial or tourist/highway commercial.

- ***Neighborhood Commercial:*** Use includes general retail and office facilities, grocery stores, gas stations, restaurants, post offices, and feed stores.

- ***Tourist/Highway Commercial:*** Use includes hotels, motels, campgrounds, RV parks, gift shops, and recreational facilities. Convenience stores and some other uses serve both local residents and tourists.

- ***Regional Commercial:*** Uses like shopping centers, "big-box" retail establishments, and movie theaters are usually located within incorporated cities and towns. The County adopted a *Zoning Ordinance* amendment in 2001 prohibiting retail establishments over 70,000 square feet.

- ***Residential Commercial:*** Uses fall into two categories: those invisible to neighbors and those with minor impacts. One is "home occupations" such as consulting services, Internet businesses, and other activities that do not draw customers to the place of business. They are secondary to the home's use as a residence and should be

Top: Indian Gardens Market in Oak Creek Canyon. Middle: Bottling plant. Bottom: I-40 at Bellemont.

nearly invisible to neighbors. "Cottage industries" are also commercial uses that can occur in residential areas. These businesses have a greater impact on the neighboring area; such impacts may include allowing customers on site and adding structures on the property.

In most of the unincorporated county, commercial uses serve both residents and tourists. In some locations, however, commercial businesses cater almost exclusively to highway travelers and tourists and should be located at or near major intersections to manage points of vehicular access, limit pedestrian conflicts, and buffer the surrounding neighborhood. In other areas, they cater almost exclusively to local residents in which case they should be oriented less to the high traffic roadways and more to the neighborhood to allow for pedestrian and bicycle access and neighborhood safety. Considering commercial activity during the development process helps ensure that neighborhood-oriented businesses are convenient to local residents, reducing their need to travel long distances for basic services.

Hundreds of home businesses are scattered throughout the county. Home occupations and cottage industries allow entrepreneurs to combine their home and workplace and to start small businesses with a low overhead. These businesses may eventually grow and move to a commercial or industrial area. Additional commercial uses have been approved in unincorporated residential areas including, but not limited to, accommodations for tourists, feed stores, kennels, and recreational facilities. Mitigating the impacts of commercial businesses in residential areas is key to maintaining the character of neighborhoods. The character of residential areas can be best preserved by encouraging neighborhood businesses rather than regional commercial businesses such as shopping malls.

Future commercial areas in Coconino County are likely to continue to be either neighborhood commercial or highway commercial. E-commerce and other new business models will bring a decrease in typical brick-and-mortar establishments. The County seeks to adapt to these trends through the adaptive reuse of existing commercial property and developments and to allow an expansion of appropriate uses—such as technology, small business start-ups, agriculture, manufacturing, and live/work entitlements—in commercial zones. This *Comprehensive Plan* and the nine area plans encourage locating commercial development at major intersections and in existing communities; indeed, most commercial land use has evolved at such locations. These plans also strongly discouraged "strip development" because it promotes inefficient movement and detracts from an area's visual character. Design guidelines for new commercial and industrial uses have been adopted in a number of communities through the area plan process. The area plans for the communities of Doney Park / Timberline /Fernwood, Oak Creek Canyon, Kachina Village, and the Fort Valley have design guidelines. While the *Mountainaire Area Plan* has not adopted any, it does suggest revisiting the topic. Such guidelines can significantly improve the quality of the built environment without narrowing architectural choices or increasing costs—all while maintaining community character.

GOAL

Ensure that commercial development is well designed and appropriately located within communities and activity centers.

POLICIES

25. Commercial development projects shall be located and designed in a manner that is compatible with the character of the area in which the project is proposed.

26. The County supports locally based, neighborhood, commercial businesses.

27. Regional commercial uses such as shopping malls and large retail establishments are encouraged to locate within incorporated municipalities to obtain a full range of urban services.

28. Large-resort commercial uses should only be sited in appropriate locations that can be adequately served by roads, water, sewer, and other public facilities and services, and shall be discouraged from locating in inholding areas.

29. In reviewing the environmental impacts of a proposal, the County will require development projects to demonstrate sensitivity to the natural and cultural environment including preservation of views, trees, and native vegetation; consideration of wildlife; preservation of dark skies; and conservation of water resources.

30. To facilitate efficient and safe traffic movement and avoid aesthetic problems, strip commercial development is strongly discouraged in favor of clustered, mixed-use, commercial development that supports multimodalism and walkability.

31. Where new commercial development projects are proposed adjacent to residential areas, connectivity shall be provided while efforts to mitigate sound, smell, and unsightly views shall be required.

32. Rezoning to commercial shall be consistent with applicable planning documents, and zone changes shall be conditioned based on specific site plans and for specific uses.

33. The County shall expand entitlements for light industrial and other uses that are consistent with the objectives of commercial zoning.

34. The County shall promote and expand opportunities for home occupations and cottage industries in residential areas that do not intrude or diminish the residential character of neighborhoods.

35. The County shall promote live/work opportunities by allowing residential use for caretakers and owners on commercial properties.

MIXED USE & ACTIVITY CENTERS

Finally, the development scenario of mixed use offers an alternative: a residential use within or adjacent to a commercial building or a commercial use within or adjacent to a residential building—for example, lofts or apartments above a shop or office or, conversely, a coffee shop on the ground floor of the apartment building. Currently, the *Zoning Ordinance* only permits this by rezoning to a "planned community" zone.

The *Flagstaff Regional Plan 2030* designated several major intersections and commercial areas as activity centers, which may include small-scale retail facilities, offices, schools, transit stops, parks, or other civic facilities, and other businesses designed to meet residents' needs. Designating activity centers outside of the FMPO boundaries can help concentrate development; allow for community hubs where people can live, work, and play; and support multimodalism. The County should pursue the designation of such areas with input from local communities. Allowing residential uses in association with commercial uses in these activity centers should be supported.

GOAL

Increase creative and mixed land uses that result in self-sustaining communities and walkable and vibrant activity centers.

POLICIES

36. Design flexibility that results in a mix of compatible land uses is strongly encouraged.

37. Explore the establishment of a new zoning district for mixed use development and entitlements for residential under existing commercial zones.

38. Work with communities to designate and describe the future of activity centers in their area.

INDUSTRIAL & LIGHT MANUFACTURING LAND USES

Industrial uses are important to the economy of Coconino County. Because most industrial facilities need municipal water, sewer, fire protection, and other services, they are located within and near cities and towns.

- ***Industrial:*** Uses tend to have heavy equipment and the potential for noise, smoke, odor, or other impacts to neighboring properties. These uses, while important to Coconino County, must be sited with caution.

- ***Lighting Manufacturing:*** Uses may be more compatible with other land uses such as commercial or activity centers because they occur inside buildings, and the traffic associated with them is limited.

Industrial development at Bellemont.

Coconino County has several assets that are key to the logistics for industrial activities. One is a major east-west railroad that has the potential for additional spurs. Another is the interstate highway system linking Mexico with an east-west route across the country. Finally, there is the proximity to the international ports of entry at Los Angeles and Long Beach, which are within 1 day of travel.

As of 2014, about 700 acres are industrially zoned in the county. Areas of heavy industrial zoning and development are located near Winona (56 acres) and on Leupp Road (186 acres) in the Doney Park area. A total of 187 acres are industrially zoned in Bellemont. Considerable additional development is possible at both the Flagstaff Ranch Road and Bellemont locations, preferably warehouse, distribution, and light manufacturing uses that do not require large amounts of water. Although there has been discussion over the need for more industrially zoned land, the County is hesitant to speculatively zone as it did in Bellemont, where many sites are still undeveloped. Reasons for the lack of development in this area are partly due to the cost of developing in unincorporated areas and partly due to the increase in the price of property that is zoned industrial.

With ever-increasing ways to mitigate impacts to neighboring properties, some operations that have typically been classified as industrial and light manufacturing uses may become more acceptable in other zones. For example, the temporary processing of forest materials may be appropriately located near harvesting sites on general zone properties. Additionally, some light manufacturing operations have similar impacts to those of office buildings and could potentially be located in commercial areas. These issues could and should be pursued through amendments to the *Zoning Ordinance*.

Mining has never had a significant economic impact on Coconino County. Mining activity is confined to sandstone quarries north of Ash Fork and to cinder and materials pits throughout the county. However, many mining claims could be reactivated if markets for certain minerals, such as uranium, improve. Most mining activity occurs on State Trust or federal land, over which the County has no jurisdiction. Likewise, on private land, mining operations that exceed 5 acres are exempt from County zoning per state statutes. However, mining activities outside of the county may directly impact the county—for example, coal mined in Navajo County is transported by train to the Navajo Generating Station in Page to produce electricity.

In 2008, the BOS adopted a resolution opposing uranium mining within Grand Canyon and its watersheds. More than 2,000 uranium mine claims had been established in the Tusayan ranger district the 5 years preceding the resolution. Uranium mining may impact our watersheds and water quality (such as in Horn Creek, which has been contaminated) and cause public safety issues such as those related to transporting uranium. In 2012, a federal ban on new uranium mining claims was continued for 20 years; however, existing rights to claims on both the North and South Rim of Grand Canyon remain viable.

GOAL

Encourage the development of the industrial lands within the county, provided they are compatible with the policies of this Plan as sustainable employment centers, and maximize their strategic multimodal location.

POLICIES

39. The County promotes and supports industrial uses based on compatibility with the surrounding uses and impacts to environmental resources.

40. The County shall support industrial development projects in areas that are currently zoned industrial and where an adequate levels of infrastructure exists or could be reasonably developed.

41. Industrial uses along scenic corridors or at community gateways are discouraged unless they enhance and protect the aesthetic quality of the area.

42. Continue to review uses allowed in the zoning code to expand compatible industrial and light manufacturing opportunities in the county.

43. Rezoning to industrial shall be consistent with applicable planning documents and zone changes shall be conditioned based on specific site plans and for specific uses

44. In order to protect local interests, the County will continue to actively discourage and prevent uranium mining in the Grand Canyon watershed.

PUBLIC USE / SERVICE LAND USES

Large public use / service / utility land uses, often referred to as ***locally undesirable land uses (LULUs),*** feature facilities such as sanitary landfills, wireless communication towers, wind farms, aggregate operations, and high-voltage transmission lines. Most, if not all, of these facilities are essential for basic economic infrastructure or social purposes. The County strives to site such facilities in a way that minimizes disturbance and maximizes mitigation to reduce impacts. The *2001 Wireless Telecommunications Facilities Ordinance* encourages providers to locate wireless communication facilities in disturbed

Locally Undesirable Land Use (LULU). FILE PHOTO

STEALTH Telecommunications Facility at Lake Mary.

areas or in areas where towers already exist. It discourages towers in scenic viewsheds and residential areas and encourages the colocation of facilities. The *2012 Energy Plan Element* (Appendix D) discusses similar mitigation policies for wind farms. Although some land uses (such as mining) are exempt under state statute, most public use / service land uses can only be approved through a conditional use permit and public hearing process. The County is also working to create performance standards for permitted uses to ensure that impacts to neighbors are limited.

State legislation requires the County to maintain land suitability for aggregate mining operations. (Aggregates are particulate materials such as sand, gravel, and crushed stone that are used in construction to make concrete and are typically mined from riverbeds.) State maps showing locations of these operations are not yet available. The state also requires the County to adopt policies to preserve currently identified aggregate mining operations and to avoid their encroachment by incompatible land uses that may impede the expansion of future aggregate mining operations. This chapter's goals and policies focus on minimizing potential conflicts between aggregate mining and nearby uses for the benefit of both parties.

GOAL

Minimize the impacts of public use / service land uses on the environment and community character.

POLICIES

45. The County shall work closely with applicants for public use / service land uses to minimize the potential impacts on residential areas, rural character, and the environment.

46. The County shall coordinate with developers of these types of facilities to educate and inform the public as to the importance of these larger public uses that serve a greater community need.

47. The County shall continue to engage the public on the siting of potentially incompatible uses through the conditional use permit process.

48. The County shall justly distribute LULUs and not overburden some areas or populations with negative impacts from shared infrastructure.

49. The County shall integrate existing and potential aggregate mapping data into its GIS once it becomes available from the state and shall adopt legal and practical means to protect identified aggregates from incompatible land uses through the development review process and any other applicable mechanism.

SMART GROWTH STRATEGIES

Coconino County's land area, rural character, population densities, and expected patterns of population change create unique growth-related issues. Outside of the Flagstaff area, the more typical problems of urban sprawl simply are not a major cause for concern. Of more concern are the issues of land consumption, loss of habitat, loss of rural character, and the availability and cost of infrastructure and services.

Identifying future growth areas and strategies to mitigate the negative impacts of growth makes good planning sense. Locating and designing future development wisely is essential to meeting the County's goals of maintaining healthy ecosystems and encouraging smart growth, as well as for developing infrastructure cost effectively.

Because accommodating future growth responsibly hinges on making sound land use decisions, this Plan advocates ***integrated conservation design*** and the coordinated development of properties. This section discusses key factors in designating growth areas, looks at the future of federal and State Trust lands, and examines the County's options for paying for future growth, including ***infrastructure*** improvements planning.

Managing growth involves balancing ideals. Continuing the existing large-lot development patterns, for example, hastens land consumption but preserves residents' traditional perceptions of "rural character." Many residents have moved to certain areas specifically to enjoy this "rural lifestyle." Likewise, exchanging national forest lands and selling State Trust lands is unpopular with adjacent property owners who erroneously perceive that these lands are protected from development as open space. In some cases, these state or federal lands occupy areas where transportation corridors and utilities could be logically extended, making them prime candidates for development. Higher-density redevelopment and infilling are also typically controversial with neighbors, even though they reduce land consumption and allow us to protect more open space. Although this *Comprehensive Plan* generally discourages high-density development in remote areas, developers could provide levels of infrastructure and service to support new communities such as at Glittering Mountain. As a long-term growth strategy, development of new communities should be coordinated with growth boundaries and designated activity centers through the adoption of new area plans.

CONCENTRATING GROWTH & ACTIVITY

To concentrate growth, the County can use several management strategies. The *Flagstaff Regional Plan* establishes growth boundaries and activity centers. These same concepts can be applied outside of the *Regional Plan* area but require local public involvement. The most likely mechanism for this process will be via the updating of existing area plans and the creation of new ones.

The *Regional Plan* established ***rural growth boundaries*** within the FMPO around some of the private land that is currently under County jurisdiction and within five of the existing County-adopted area plans. These area plans are quite large and the rural growth boundaries established by the *Regional Plan* include portions, but not necessarily all, of the adopted area plans. In some areas, private inholdings were not included within the ***growth boundary*** because future development was intended to conform to the existing zoning. These areas—Hart Prairie, Rogers Lake, and lands south of Lake Mary Road—lie within a national forest, farther from established communities. Concentrating new development within specific growth boundaries further protects ***landscapes*** and habitats, conserves resources, and minimizes the impacts to ***ecological processes***. New growth must also be supported by a range of development opportunities that provide a diverse employment base, affordable housing, and access to services. Identifying specific locations as planned or desirable growth areas not only provides additional certainty to developers, but it also conserves both natural and economic resources.

Outside of the *Flagstaff Regional Plan* area, existing and new area plans could further define or establish growth boundaries and activity centers, particularly for growing communities such as Blue Ridge, Forest Lakes, Mormon Lake, and Pinewood / Munds Park. Updates to the existing area plans for the central core area of Parks and Valle might also be appropriate. Such boundaries and activity centers would facilitate approval for higher-density or commercial development in areas that are already served by infrastructure and in areas where fire protection and other services are available. This type of

planning will require coordination with private property owners, public land managers, and the ASLD to be successful. Furthermore, it addresses the need to avoid leapfrog development and "single parcel" approaches. Within the 10-year horizon of this Plan, County efforts will focus on updating and creating new area plans. In these planning efforts, identifying activity centers and growth boundaries will ensure that this Plan's goals and policies are implemented.

REDEVELOPMENT, INFILL, & HIGHER DENSITY

Infilling is likely to be a viable method for accommodating growth in the near future. The *Regional Plan* and all of the county's area plans call for developing the existing private land base before looking to other lands (*see the County Area Plans with FMPO Boundaries map at the end of this chapter*). Additional growth could be accommodated using a variety of approaches including expanding the existing rural growth boundaries within the FMPO area and establishing new activity centers to promote concentrated, mixed-use development in key areas. Both of these approaches include redeveloping certain areas to increase their density and encouraging economic growth in existing bedroom communities to be self-supporting.

New growth could occur in other parts of the county—for example, near major highways, at key interchanges, or within new mixed-use communities where infrastructure has been provided as part of the development. A few small portions of State Trust land have the potential for development adjacent to existing development (for example, in Greenehaven) or they have already been developed (for example, on Route 66, just west of the Flagstaff city limits, and at Twin Arrows). By concentrating growth in higher-density areas, the County hopes to address infrastructure needs and provide for orderly and quality development in phases. This would only happen, in phases, if developers work with the County through the *Subdivision Ordinance* and master plan process.

STATE TRUST LANDS & FEDERAL LANDS

State Trust lands are managed as a trust with 13 beneficiaries, the largest of which is Arizona K–12 public schools. The mission of the Trust, as outlined in state statutes, is to maximize revenues for its beneficiaries. In Coconino County, most State Trust lands are leased for grazing, while some are also leased for commercial and other purposes, such as recreation. Some have been sold in the Flagstaff area, both for development and for the conservation of open space to serve area residents. Within the Flagstaff urban growth boundary, the *Regional Plan* identifies 5,508 acres that may become eligible for future development. The ASLD coordinates with communities to plan for the development of State Trust lands in a manner that is harmonious with community character and the planning policies of the area.

In rural areas where private or State Trust land may be suitable for assemblage, Rural Planning Areas should be developed to guide the exchange of these lands, establish TDR criteria, and prioritize areas for conservation easements. Generally, though, the County would like to see most State Trust sections in rural areas be retained as open space and leased for grazing or managed for conservation in conjunction with large ranches.

USFS and BLM lands can be exchanged for private lands, a process that has been used extensively over the last half century. Land exchanges can direct growth away from remote or environmentally sensitive lands and focus it near existing communities where infrastructure is available or easy to accommodate. The process is initiated by owners of private inholdings. An environmental assessment must be completed by the federal land

management agency, and exchanges are based on fair market value. This occurred in the 1990s in Blue Ridge, where isolated private sections were traded for forestland adjacent to existing development. This program allows the land managers to consolidate lands, protect important habitat areas, and free up additional land for growth.

Private parcels are good candidates for land exchange when they are inholdings and contain ***riparian areas***, open meadows, or other environmentally sensitive lands. In addition, some very remote parcels should be acquired to prevent wildlife habitat fragmentation and avoid the problems associated with providing services to such areas. Acquiring such lands means trading existing federal lands for development. In some cases, these lands can be located in communities outside the county. The *Flagstaff Area Open Spaces and Greenways Plan* identified forestlands in the Doney Park area as low priority for retention as open space—lands that could eventually be exchanged for future development. There are likely additional lands adjacent to existing communities where growth and the extension of services are logical.

Because most federal land lies within the open space zone, a zone change is required for development after the exchange—and such changes are not automatic. The property owner typically requests a zoning reclassification based on zoning in the immediate area. This request must be approved by the ***Planning & Zoning Commission (P&Z)*** and BOS, which are responsible for appropriately vetting compatible development with existing surrounding uses.

GOAL

Concentrate development near existing infrastructure and services while conserving ecosystems and landscapes.

POLICIES

50. The County strongly supports compact infill development in existing urban, suburban, and rural activity centers before outlying and more remote lands are considered for development.

51. Identify priority areas for Rural Planning Areas to support the logical development and conservation of such lands.

52. Rezoning to higher density is discouraged on remote inholding where the provision of infrastructure is not a logical extension of existing improvements.

53. The County supports federal acquisition through the exchange or purchase of private inholdings surrounded by national forest or BLM lands that are important habitat areas, that contain environmentally sensitive lands, or that would reduce fragmentation.

54. Promote regional collaboration by partnering with federal and state agencies, communities, and private landowners on the protection of environmentally sensitive lands and open space for its value to wildlife and on the preservation of our dark skies to conserve the overall quality of life enjoyed by residents of Coconino County.

55. The County will consider designating growth boundaries within existing County-adopted area plans as well as when new area plans are created or existing area plans are amended or updated.

INTEGRATED CONSERVATION DESIGN

The *Comprehensive Plan* advocates a system of land use planning that reverses the trend of consumptive sprawl. Another method for achieving this goal involves ***integrated conservation design***, a conservation-based approach that offers a wide range of options for developments featuring large parcels of land. Integrated conservation design does not negate the rights of private property owners; on the contrary, it offers expanded, more flexible, options for development.

Conservation-based planning differs from the "standard development grid" in two key ways. First, it offers protection for ***environmentally sensitive features*** such as wetlands, riparian areas, steep slopes, and wildlife habitat. The value of such environmental amenities is evident from the high percentage (40%) of people who purchase golf course lots even though they don't play the game[2]; these buyers want the open space views associated with such properties. Second, conservation-based planning often integrates recreational amenities such as sports fields and playgrounds into new subdivisions, benefiting entire communities. Imagine a property featuring forestland and an open meadow that provides important wildlife habitat. Conventional development approaches advocate dividing it into individual lots and scattering houses throughout. Integrated conservation design, on the other hand, advocates tucking the houses into forested areas but leaving the meadow undeveloped. Likewise, if the property contains a wetland or floodplain, conservation-based methods would place any buildings outside of these areas, leaving valuable habitat, open space, or other amenities that all property owners could enjoy.

Integrated conservation design identifies the environmentally sensitive features and natural assets of the site before drawing lot lines and roads. RANDALL G. ARENDT

The process for developing a property using integrated conservation design methods also differs from conventional development processes. In Coconino County, a parcel's zoning determines its permitted density or the number of units allowed "by right" within in a specified area. Developers and engineers typically begin the design process by drawing roads and lot lines on a map. In contrast, conservation-based planning advocates identifying environmentally sensitive features before identifying the most suitable building sites based on factors such as the allowable density and the natural features of each parcel. The next design step entails aligning streets and trails. The final step is drawing lot lines. There are options, incentives, and varying methods for integrated conservation design.

[2] Arendt, 1999. Reproduced by permission of APA Planners Press.

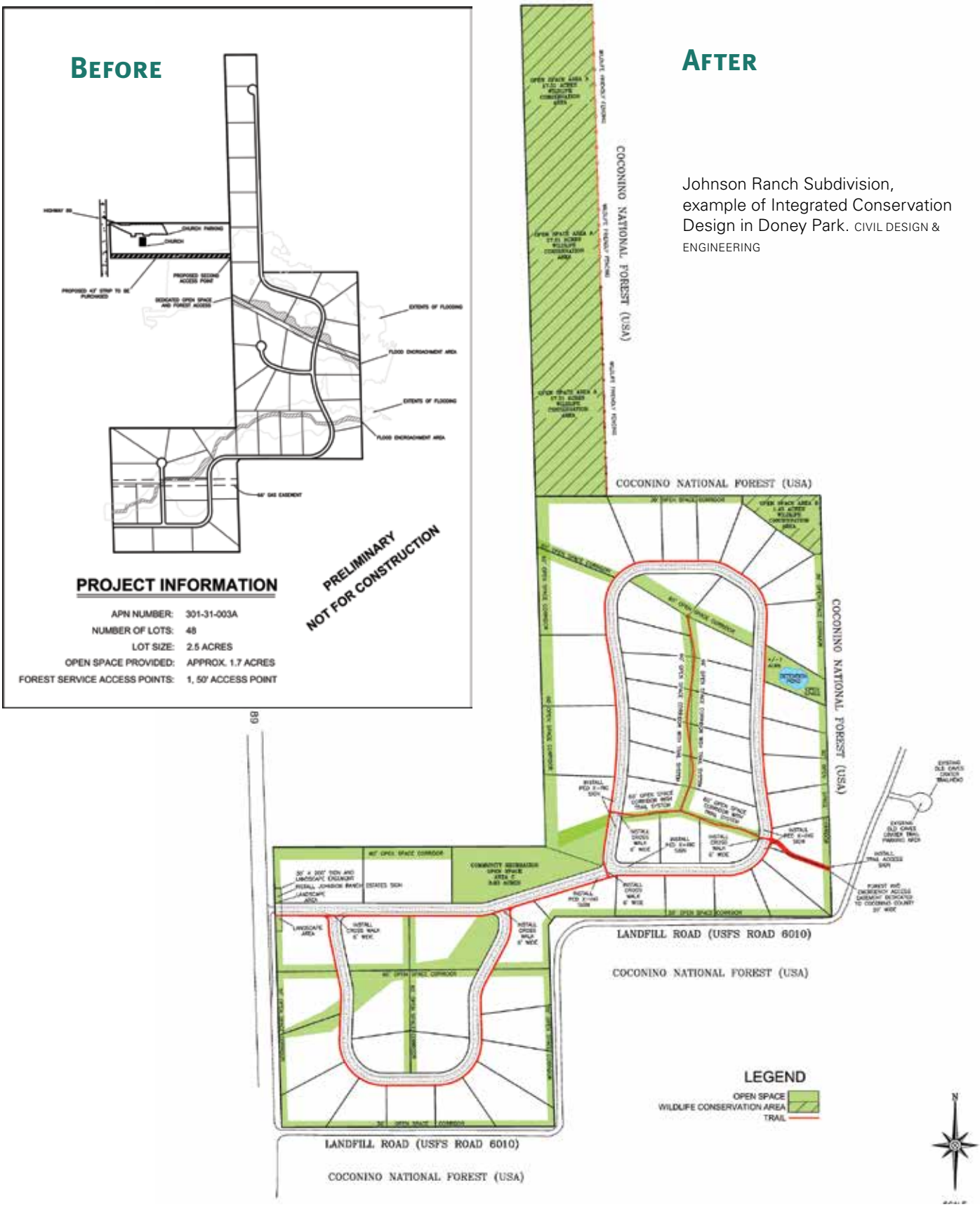
Integrated conservation design (right) accommodates the same amount of development as its conventional counterpart (left)—in this example, 32 lots. The difference, however, is that the integrated conservation design leaves 65% of the site dedicated to open space, a permanent amenity shared by all property owners. Conventional development gives each owner a 2.5-acre parcel surrounded on all four sides by neighbors, whereas integrated conservation design gives each resident uninterrupted views of the surrounding landscape and access to over 50 acres. RANDALL G. ARENDT

Integrated conservation design applies to a wide range of development projects, not just to low-density, high-end subdivisions. Two good examples of successful conservation design for moderately priced homes are found in Doney Park, where zoning density was increased to accommodate open space. Integrated conservation design could also work well for manufactured homes. Regardless of the type of development, integrated conservation design lets landowners maximize the use of their properties while offering the fundamental advantage of protecting a network of conservation and open space lands throughout the county.

The County would prefer to work with property owners and developers to explore creative designs that best apply to a particular area or site. Many "planning tools" are available for the development and design of new subdivisions that encourage the expanded use of integrated conservation design techniques. Several such "planning tools" are detailed below.

Cluster Development

This approach involves "clustering" development on portions of a property that are not environmentally sensitive and allowing the same net density that would be permitted with a conventional design. This approach not only reduces infrastructure costs, but it also lowers building costs, which are typically more expensive in areas such as floodplains and wetlands. For example, consider a 100-acre parcel with a zoned minimum parcel size of 2.5 acres for 40 lots. In this scenario, these 40 lots could be reduced to just under 1 acre in size and clustered together within an area that takes advantage of a major viewshed or conserves an environmentally sensitive feature, leaving 60 acres of open space.



Johnson Ranch Subdivision, example of Integrated Conservation Design in Doney Park. CIVIL DESIGN & ENGINEERING

Transfer of Development Rights

This program relocates potential development from areas where proposed land uses or environmental impacts are considered undesirable —a "donor" site—to a "receiver" site. The receiver site is chosen because of its ability to accommodate additional units of development beyond that for which it was zoned, with minimal environmental, social, and aesthetic impacts. Even though the State has enacted legislation (*ARS §11-817*) to provide for TDR ordinances, the County has not yet adopted such an ordinance that would allow, and thus encourage, the use of this technique.

Building Envelopes

This design approach features dispersed clusters of home sites each with a designated "building envelope," or space in which structures are permitted to be built. In this scenario, the land surrounding each site, plus all other undeveloped land, is held in common by all owners for conservation purposes. The home sites are strategically located to minimize impacts on the environment.

Density Bonus

Another approach for encouraging integrated conservation design is to offer an incentive in the form of a ***density bonus*** for including open space in a development. If a specified percent of a project is set aside as open space (preferably for public access and use), perhaps the number of units could be increased by a specified percent or number. However, for this to occur, the County would need to amend its *Zoning Ordinance*. The details would be worked out with resident input through the public hearing process that is requisite for all ordinance amendments.

Ordinance Amendments

Updating the County's *Zoning* and *Subdivision Ordinances* to allow for best practices and integrated conservation design techniques to be used by right would be a proactive step towards conservation and development.

GOAL

Ensure that new development implements integrated conservation design practices.

POLICIES

56. The County supports integrated conservation design, clustered subdivisions, density bonuses, and TDR to conserve portions of the property that are environmentally sensitive or for shared public or open space.

57. Work with developers early on to incorporate integrated conservation design practices into projects.

58. Incentivize integrated conservation design through amendments to the *Zoning* and *Subdivision Ordinances*.

CAPITAL IMPROVEMENTS

Capital improvements include a wide range of physical infrastructure facilities and systems needed to support communities. The most basic include transportation infrastructure, water and ***wastewater*** systems, utilities, libraries, and schools, as well as facilities required for public safety, medical and health care, parks and recreation, and solid waste disposal, among others. Various entities are responsible for capital improvement projects. In the public works arena, for example, Coconino County administers

road, drainage, flood control, parks, and transit projects. Other entities such as school, fire, and special ***improvement districts***, as well as private-sector organizations, address capital improvements in their respective areas. The *Coconino County Comprehensive Plan* encourages such entities to coordinate in ensuring that facilities are provided in the right places, when needed.

Typically, capital improvement plans (CIPs) identify, prioritize, and schedule capital facility improvements over a certain period, usually 5 or 10 years, but sometimes up to 20 years. This allows local governments to match their capital expenditures with needs of existing and developing communities; in some cases, the CIP can guide development in a preferred direction. In Coconino County, priority is placed on critical infrastructure improvements necessary for public safety and wellbeing.

Capital improvement planning should consider the overall socioeconomic effects of proposed projects, which should be compatible with the existing community character and should not affect neighborhoods negatively. Scenic, environmental, and other resource-related impacts are also important considerations. Furthermore, generally accepted planning principles call for only the logical extension of existing infrastructure to avoid the long-term negative impacts of sprawl, avoid unnecessary leapfrog development, and ultimately provide capital improvements in the most cost-effective manner to serve the greatest number of residents.

GOAL

Coordinate capital improvements in a timely, orderly, and cost-effective manner.

POLICIES

59. The County will set an example in its capital improvement planning process by considering the overall social, economic, energy, and environmental effects of proposed projects.

60. Capital improvements shall be planned, constructed, and operated in a manner that provides for the logical extension of existing infrastructure, is compatible with community character, and is in harmony with scenic and environmental resources.

61. Private development projects shall coordinate infrastructure improvements to be consistent with public CIPs.

62. As part of the capital improvement planning process, the County will identify and determine the means of dedicating sites and acquiring rights-of-way for future improvement projects.

COST OF DEVELOPMENT

Another challenge the County faces is paying for growth. One possible option is assessing ***impact fees*** to cover the cost of capital projects associated with new development. Ideally, cost-recovery methods are tied to a CIP adopted by the County. Through capital improvement planning and successful allocation of the costs associated with new growth, residents are assured an acceptable level of services.

Development projects must pay for on-site infrastructure such as wastewater, circulation, and utility improvements and they are often required to pay for off-site improvements such as turn lanes and water lines. However, the general tax revenues provide the only way to pay for other public facilities such as new ***parks*** and trails, sheriff's facilities,

traffic signals, utility upgrades, schools, and highway improvements. Additional taxes generated from the development are often not enough to cover these costs. Instead, funds originate from bonds, special districts, impact fees, and/or dedications. Bonding and dedicated sales taxes have funded school improvements and, more recently, open space and park improvements. Special districts have funded road improvements.

Coconino County has not yet chosen to assess impact fees on new construction, although it has the legal authority to do so. Such fees could be added to the building permit fee to offset a portion of the cost of the capital projects required to support the new development. Needs are determined via a study that covers the geographic area around the development. Impact fees can only cover the incremental cost of the capital facility that is attributable to each house, and fees must be spent in the area where they were collected to benefit residents. Jurisdictions around the country charge impact fees to cover costs for road improvements, police and fire stations, parks, libraries, traffic signals, and many other public services and facilities.

In a rural county where few permits are issued in any given area, it is difficult to implement an impact fee program. Impact fees have been discussed for the Doney Park area to improve roads and parks; however, because few permits are issued there, the fees would pay for a very small percentage of the improvements. Another issue is that impact fees can only pay for improvements related to new development, not existing deficiencies, and the connection between improvements and development is not always clear. Further study is required to determine the feasibility of impact fees and other sources of revenue for future capital improvements.

GOAL

Ensure that every new development pays its fair share of costs associated with that development.

POLICIES

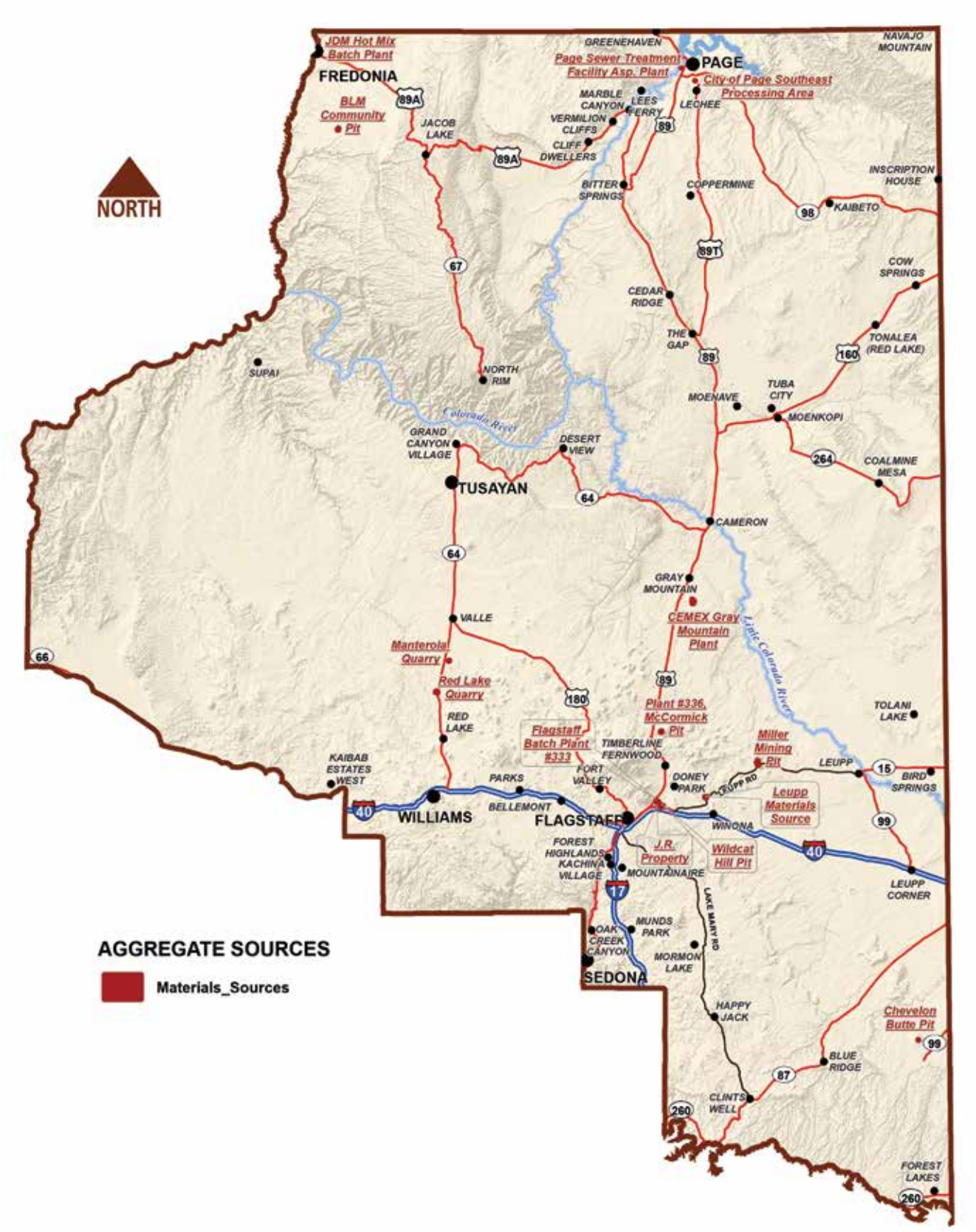
63. Development projects shall be required to pay their fair and roughly proportional share for off-site improvements and public facilities such as the roads and utilities necessary to support the development.

64. Applicants for all new development projects shall assure an adequate level of services including roads, water and wastewater, fire protection, and utilities.

65. Assess and set fee structure to address future growth and development projects.

66. As deemed necessary to support major developments and subdivisions, developers in cooperation with utility providers shall be responsible for the installation, construction, or upgrade of necessary public utilities without diminishing the level of service to existing residents.

Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.



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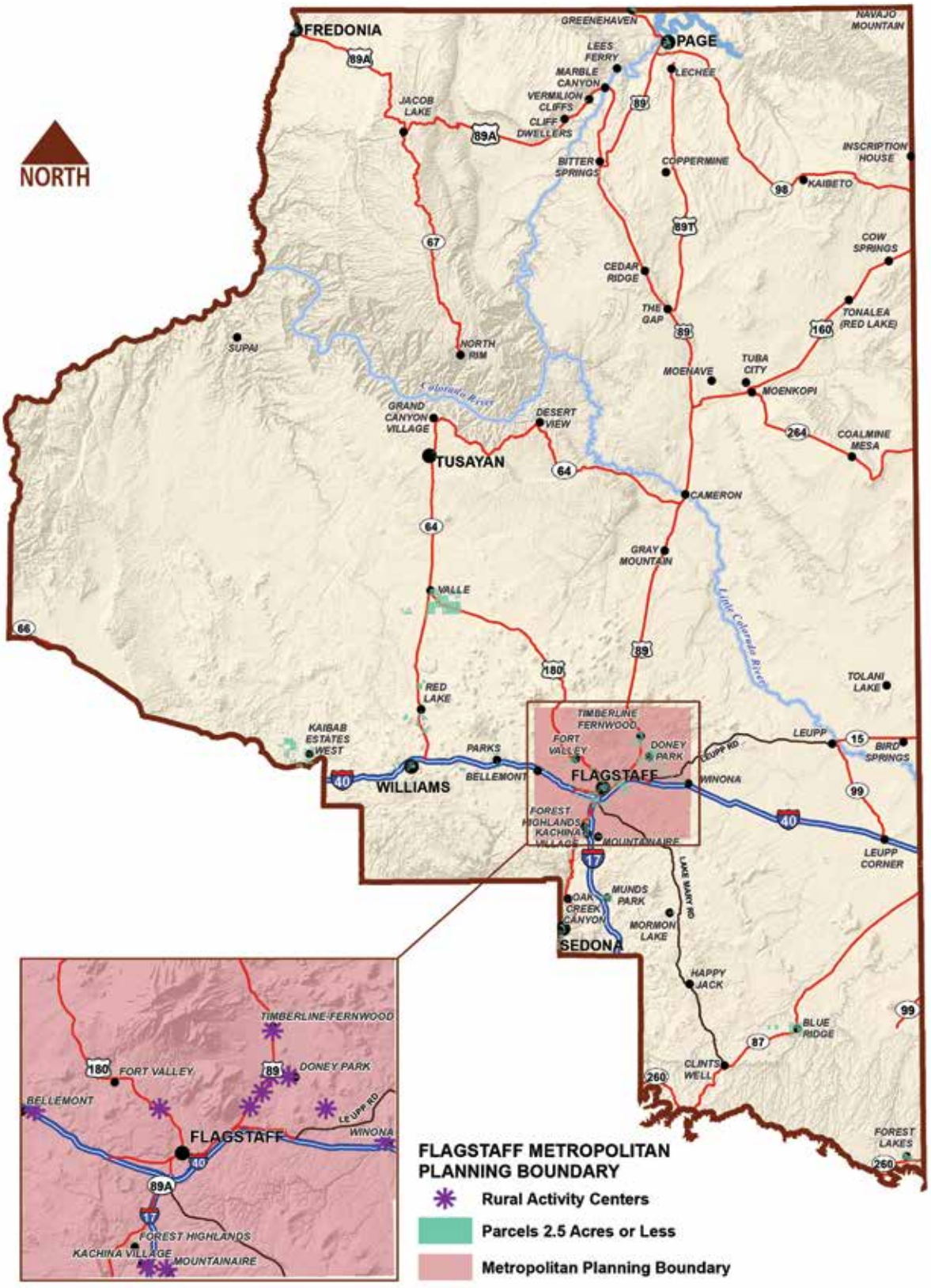

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Community Character

INTRODUCTION

Coconino County features a rich mosaic of cultures, communities, residents, and physical attributes. Residents and property owners have expressed considerable interest in conserving the diverse ***landscape***, maintaining ***community character***, and improving the aesthetics of their homes. These are important for supporting the quality of life and for promoting economic development, attracting visitors, and protecting the environment and ***cultural resources***. In addition, maintaining the ***rural character*** is a core value of many residents in unincorporated communities.

This chapter describes the factors that combine to create community character in the county. It also discusses the ordinances, regulations, and other mechanisms that can help protect and enhance those characteristics that are so strongly valued. In particular, the chapter focuses on the importance of incorporating ***integrated conservation design*** principles, minimizing light and **noise pollution, and conserving scenic vistas, corridors, and viewsheds by ensuring that new developments are compatible with existing communities and the *natural environment***.

This "Community Character" chapter seeks to define, conserve, and enhance the quality of the places where we live, work, and enjoy our leisure time. Its goals include protecting the unique characteristics of our communities and providing facilities and services that

A variety of housing styles in Mountainaire and Timberline.

support community-based activities. Its policies promote areas of concentrated activity in rural communities and improve the aesthetic character of the county's commercial, industrial, residential, and ***gateway*** areas. They also conserve the county's historic, cultural, and architectural heritage, protect ecological landscapes, and enhance scenic viewsheds and byways. Other policies encourage the coordination of land use planning, the sharing of resources, and the protection of traditional ***cultural sites and practices*** through coordination among the County and other jurisdictions, public land management agencies, and tribal governments. Finally, this chapter contains policies that support the protection of quiet areas and dark skies minimizing noise and light pollution.

COMMUNITY DESIGN

Each community in the unincorporated areas of the county has distinct features that contribute to its physical character. Many of these features reflect common values for conserving rural character, appearance, natural resources, ***open space***, recreation areas, scenic views, vegetation, architecture, development patterns, and ***rural activity centers***. These features promote quality of life and economic wellbeing. Conserving them should not prohibit ***development***; however, the County needs to consider them to ensure that new development fits the existing community fabric.

County residents have demonstrated a desire for well-designed communities through their plans and actions. Many communities have visions for growth that include enhanced design and building compatibility. Having design guidelines enhances a community's livability, image, and pride. As of 2015, nine communities had detailed ***area plans***, of which five include ***design review overlay zones (DROs)*** that provide guidelines to integrate new commercial, industrial, multi-family, public, and semipublic development into the fabric of the existing community or into a desired future vision. The DROs are provided for in the *Zoning Ordinance*; this ordinance requires the ***Planning & Zoning Commission*** to review development projects for compliance with the design guidelines that are specific to area plans with DRO provisions. Review criteria cover architectural style, building materials and colors, overall site design, signage, ***landscaping***, and lighting. The DRO process allows the public to provide input on how to best

incorporate structures into the community, starting from the initial stages of development. Communities with DROs include Doney Park / Timberline / Fernwood, Kachina Village, Mountainaire, Oak Creek Canyon, and Fort Valley (*see the County Area Plans with Design Review Overlay Zones map at the end of the chapter*).

Commercial development patterns vary not only according to the ordinances in effect at the time, but also to community needs as well as existing and emerging business trends. For example, most commercial development in the Marble Canyon / Vermilion Cliffs area targets Grand Canyon visitors and recreational users such as hikers, rafters, and fly-fishers. Many communities have unique characteristics that attract tourists or make them travel destinations. Most commercial uses, whether tourist- or neighborhood-oriented, want optimal visibility through signage or unique building features to attract business. However, this need should not detract from the ***scenic corridors***, surrounding communities or natural features. For this reason, the County maintains development performance standards for commercial, industrial, multifamily residential, public, and semipublic uses that address landscaping, signage, lighting, parking, setbacks, and screening. In area plans with DROs, the standards are enhanced by design guidelines that apply to overall site design, architectural features, building materials, and colors.

Gateways are unique areas that deserve attention to land use and special design considerations. Coconino County has two types: "gateway corridors" and "***gateway communities***." Gateway corridors include ***arterial roadways*** that provide access into an existing community, recreation area, or park. These corridors are often desirable for visitor-oriented commercial enterprises. Development projects proposed for the gateway corridors should discourage strip commercial development and restrict excessive and off-site signage (*see the Gateway Corridors and Scenic Roads map at the end of this chapter*).

Gateway communities include both commercial and residential developments adjacent to national parks, monuments, and recreation areas, as well as along highways leading to such areas. The nine communities shown on the Gateway Corridors Map each have the potential to be identified as a gateway community. As such, they can work to create performance standards through County ordinances or through updated or new area plans. Such standards would conserve the attributes that are most important for attracting visitors and protect the unique characteristics of these communities. Communities can self-identify through a public process and work with the County to apply the performance standards in the *Design Review Overlay Ordinance* to their community or corridor.

Furthermore, as a means for appropriately accommodating future growth and development, the County will continue to coordinate with local residents to identify gateway communities and/or update area plans that provide more specific policies and guidelines for individual communities and unique geographic areas.

GOAL

Develop well-designed communities that promote rural character and conserve open space and natural resources while enhancing quality of life and economic vitality.

POLICIES

1. At the request of communities, and with priority for gateway communities, the County shall assist with the development of revised and new area plans with DROs to provide specific policies and guidelines for individual communities and unique geographic areas to ensure a logical arrangement of buildings,

provide appropriate screening and landscaping, and maintain compatible building forms and materials.

2. The County encourages private property maintenance and proactive enforcement of performance standards in residential, commercial, and industrial areas.

3. The County encourages developing employee housing in and around gateway communities.

4. Where feasible, the establishment of intensive land uses within existing communities should be compatible and integrated into the area through appropriate mitigation measures such as buffering, density transitions, landscaping, or increased setbacks.

5. The County encourages the protection of significant natural, cultural, and historic resources and unique community characteristics.

6. Public and semipublic uses shall be approved at locations convenient to the population being served, provided that such locations are compatible with and complimentary to surrounding neighborhoods.

7. Public input from individual neighborhoods and communities shall be considered in defining the existing and historical character of those areas.

8. Developers are encouraged to gather and integrate local public input early in the process of creating the conceptual designs for their projects.

Dancer at Hopi House, Grand Canyon National Park.

ACTIVITY CENTERS

Activity centers are areas of concentrated activity where community services and circulation infrastructure often converge or where community services are located at major intersections of highly traveled transportation corridors. Often these centers serve as gateways to communities and help define the character of surrounding neighborhoods. Land uses in these centers are commercial, industrial, public, and semipublic; they vary depending on the characteristics and needs of the area. Clustering in one central location is preferred over strip development, especially along major highways. Strip development is discouraged because it results in visual impacts, causes traffic congestion, and negatively impacts adjoining neighborhoods and rural character.

Because activity centers bring many uses together, their supporting infrastructure should promote ***multimodal*** transportation opportunities. Circulation infrastructure must also be considered in the design of properties adjacent to activity centers. Not only should these circulation patterns specify how sites will connect to the existing road network, but they should also address possible shared parking and/or driveway access points. This is an important public safety consideration, since the potential for conflicts between vehicles, bikes, and pedestrians increases in congested areas.

As the more remote areas of the county are developed, common areas used as community gathering places become essential for neighborhood interaction and activities. Activity centers that provide common neighborhood space—such as convenience stores, restaurants, small retail and post offices, and parks—play a role in defining a community's character. Several subdivisions have included community activity centers in accordance with their development plans. In addition, it is common for facilities such as fire stations, churches, and schools to effectively serve a double function as local gathering places.

Other than the annual Coconino County Fair, few community activities draw residents to single events on a countywide level because our population is so dispersed. Most activities occur locally, fostering connections between community members and raising a community's ***sense of place***. Local organizations, recreational opportunities, and natural and cultural resources promote a sense of community, as do activities such as holiday parades, festivals, farmers' markets, roadside vendors, and art or antique shows. These types of community gatherings and activities, even in the most rural areas, should be encouraged whenever possible.

GOAL

Support the development of concentrated commercial and community land uses that meet residents' needs.

POLICIES

9. The concentration of commercial, public, and semipublic uses in an activity center is desirable and encouraged.

10. Improvements to circulation infrastructure in activity centers shall reflect the scale and character of the surrounding neighborhoods and provide for multimodal opportunities.

11. The County supports the development of neighborhood commercial uses, community facilities (including shared), and activities that promote and generate public interaction.

12. The County supports community facilities and activities that promote a greater sense of place by enhancing community identity and local pride.

Wupatki National Monument. COCONINO COUNTY PUBLIC INFORMATION OFFICE

TRIBAL LANDS & INTERESTS

Coconino County is unique because of our cultural diversity and is home to six tribal nations: Navajo, Hopi, Havasupai, Hualapai, Kaibab-Paiute, and San Juan Southern Paiute. These nations occupy approximately 39% of the total land in the county. Each tribe is a sovereign nation with independent governance, and each has a distinct cultural history and relationship with the land.

The County works with tribal governments to explore mutually beneficial solutions to land use and development issues. Such cooperation and coordination is especially important for protecting mutual planning interests.

Tribal governments own both ***tribal trust lands*** and ***fee-simple lands***. Tribal trust lands are held in trust by the federal government for each tribal nation. Within tribal trust boundaries, land allotments can be granted by the tribal governments to individual members or families for their personal use.[1]. As such, these lands must comply with certain federal regulations, such as those administered by the ***U.S. Environmental Protection Agency (EPA)*** or those related to the *Americans with Disabilities Act*, even though the tribe may have authority for enforcing them. Trust lands are not subject to County jurisdiction for planning and ***zoning*** purposes. However, fee-simple lands are regulated by the County and are subject to its planning policies and zoning regulations. As with all fee landownership, these lands can be sold, leased, bequeathed, traded, or disposed of using any manner of legal conveyance.

The development of the Twin Arrows area provides a unique circumstance with opportunities for coordinating development between trust and fee lands. Already, the Twin Arrows Casino Resort has created jobs on a regional basis. Associated development in the area has been approved. An area plan would help guide the strategic development and provision of public services in a coordinated manner between the County and tribal governments.

The County is committed to developing a cohesive, working relationship regarding planning and land use issues in a manner that is mutually beneficial. Local and tribal governments frequently share resources or work together to provide resources jointly. For some tribal governments, maintaining infrastructure can be difficult because equipment and other resources are dispersed across a vast geographic landscape. In such cases, working with local entities that provide such services is beneficial. For example, the

[1] http://urbanland.uli.org/development-business/native-american-tribes-and-economic-development/

County is part of a joint cooperative agreement with the ***Bureau of Indian Affairs (BIA)*** for maintaining selected BIA roads. As a result of the increased funding from Proposition 403 (approved by voters in 2014), the County will maintain 286 miles of BIA roads on the Navajo Nation (a 30% increase in miles maintained). In addition, the County will provide $200,000 in matching funds to the Navajo Nation for annual improvements on BIA dirt roads. The County can build on this type of cooperative effort to maintain mutually beneficial partnerships in the future.

Most Native American tribes have significant cultural and sacred sites located within and outside the boundaries of their tribal lands. Some are considered cultural sites because of their importance to a historical tribal event, a traditional event, or use. There are also traditional areas that are important to the practice of ceremonial activities. Each tribal government has a Cultural Preservation Office to handle inquires and protect these resources. Additionally, because there is federal legislation specific to traditional cultural resources, they are addressed separately from other archaeological resources. The *National Historic Preservation Act of 1966* includes provisions for conserving tribal historic resources as well as for making traditional religious or cultural properties eligible for listing on the National Register of Historic Places. The *1978 American Indian Religious Freedom Act* protects and preserves the rights of American Indians to believe, express, and exercise their traditional religions; its provisions grant access to cultural sites and traditional use areas on federal land. In 1996, President Clinton issued an Executive Order on Indian Sacred Sites, which strengthened the 1978 Act recommending that federal land managers accommodate access to and ceremonial use of cultural and sacred sites and traditional use areas. On the Coconino National Forest, the ***U.S. Forest Service (USFS)*** has established a tribal relations specialist to work as a liaison with the tribes and other individuals regarding the access and use of traditional cultural and sacred sites. Likewise, the Arizona Strip District ***Bureau of Land Management (BLM)*** has a tribal liaison who works with regional tribes and other individuals; this liaison ensure that tribal perspectives are provided for proposed federal agency actions and that tribes and individuals receive information about potential actions on traditional uses and sites.

Ruins at old western town of Diablo.

This legislation described above pertains only to federal lands. The County has neither a cultural resource policy nor a ***certified local government (CLG) program***. However, the tribes consider many sites on federal and nonfederal lands within Coconino County to be culturally significant. Some of these sites, such as all areas in and around the San Francisco Peaks (one of four sacred mountains to the Navajo Nation), are commonly recognized by a majority of tribes in northern Arizona as sacred for traditional cultural practices such as collecting wild plants for ceremonial purposes; others are held in confidence to protect them from desecration. The County does have a cultural resource policy for the Rogers Lake County Natural Area because it is protected under a conservation easement held by the Arizona State Parks Board. Future plans for protecting cultural resources may require the County to become a CLG through the Arizona ***State Historic Preservation Office (SHPO)***; this would increase opportunities for the proper protection of resources and use of cultural sites into the future. Becoming a CLG would enhance the County's ability to participate in coordinated efforts to support the protection of cultural resources while recognizing the rights of private property owners to use and development their lands.

On private lands within the county, there are few laws protecting cultural resources. However, should human remains, funerary objects, sacred ceremonial objects, or objects of national or tribal patrimony be found during ground disturbance and development

projects, *ARS §41-844* requires that the landowner or project manager inform the Arizona State Museum. Additionally, any development project receiving federal funding or permits must comply with the *National American Graves Protection and Repatriation Act*. Given the wealth of cultural resources on both private and publically managed lands, future cooperative efforts and coordination between the County and other land managers—federal agencies, tribal governments, the SHPO, and private landowners—may ensure the proper care of cultural resources and access to cultural sites for present and future generations.

Establishing the County as a CLG would include a process to formalize the identification and protection of cultural resources on public and private lands. While the County recognizes the importance of protecting cultural resources for present and future generations, it also has a responsibility to respect and uphold the right of private property owners. The CLG program allows the County to create exemptions for existing businesses and or land uses under certain conditions.

GOAL

Promote coordination of land use planning with sovereign tribal nations related to development and resource protection.

POLICIES

13. The County encourages expanding its collaboration with tribal governments on land use issues, development projects, infrastructure development, and cooperative maintenance through strategic planning efforts such as area plans.

14. The County supports the preservation of tribal cultural and sacred sites, ancient cultural sites, and traditional cultural areas, and recognizes these resources, including plant collection areas, as assets to our shared cultural heritage and history.

15. The County will explore options that allow for the expression and exercise of traditional cultural practices, including structures, ceremonies, and plant collection on lands under County jurisdiction.

HISTORIC & CULTURAL RESOURCES

Historic, cultural, and archaeological sites are community resources that provide iconic features or historical context to the character of each community. These assets tell us how land was used historically and how cultures were able to sustain communities in an arid environment with varied climatic conditions.

It is increasingly important to consider how to conserve our collective history and culture. ***Historic preservation*** efforts such as having access to existing site data on prehistoric and historic sites would help inform planning decisions. Site data from the Arizona State Museum provides us with a substantial record of the past, detailing how humans interacted with the landscape and each other. Without such inventories, we lack an important tool to protect these resources and risk their irreparable destruction. Conserving them not only increases opportunities for education and scientific research, but it also offers economic benefits related to increased visitor interest.

Most cultural inventories and preservation activities in Coconino County have been completed by land management agencies such as the USFS, ***Arizona State Land Department (ASLD)***, BLM, ***National Park Service (NPS)***, and tribal governments. A variety of

legislation requires federal and state land managers to inventory and conserve archaeological and historical sites to the degree possible; this legislation includes the *Antiquities Act of 1906*, *National Historic Preservation Act*, the *Archaeological Resources Protection Act*, ***National Environmental Policy Act (NEPA)***, and *Native American Graves Protection and Repatriation Act*. On the other hand, few preservation requirements have been established for private lands, either at the state or local level. Arizona passed laws in 1990 to protect human burials and associated grave goods (such as jewelry or pottery) on both state and private lands under *ARS §41-844*. When human remains or burials estimated to be over 50 years old are discovered, the owner or project manager must notify the director of the Arizona State Museum. Landowners must enter into an agreement to ensure the proper method for conserving or repatriating the remains and/or artifacts found at the site. Additionally, this law prohibits selling discovered or excavated objects.

The *National Historic Preservation Act* established the National Register of Historic Places, the nation's official listing of prehistoric and historic properties that are worthy of preservation. As of 2015, this register listed 157 properties and archaeological sites located in Coconino County, as well as 11 National Historic Landmarks. Fifty sites were listed under the *Arizona State Historic Preservation Act*, including portions of old Route 66, various archaeological sites, buildings, bridges, other structures, and historic districts. Still, many resources in unincorporated areas of the county have not been listed or even inventoried. Such resources reflect early settlements and historic land uses through buildings, sites, ***historic trails***, and roads.

The CLG Program, discussed in the previous section, allows cities and counties to apply to the SHPO for assistance and funding that they can use to create local preservation programs. In 2015, Coconino County had three CLGs: the City of Flagstaff, the City of Williams, and the City of Sedona. The County is not required to be a CLG to recognize historic structures or seek the protection of a property. However, becoming a CLG would facilitate more efficient communication for the County and residents with the SHPO, the Arizona State Museum, federal archaeologists, and tribal protection offices. An example of a recent County effort to protect cultural resources took place in 2010 when the ***Board of Supervisors (BOS)*** adopted a *Rogers Lake Cultural Resource Policy* as part of the acquisition of State Trust land that has been incorporated into the *Resource Management Plan for the Rogers Lake County Natural Area*. Most preservation efforts are undertaken by individuals and small groups that focus on specific properties or local landmarks. Establishing a County historic preservation officer to manage a CLG program would enhance coordination and promote efforts to conserve our collective cultural histories.

Top: Two Guns ruins.
Bottom: Artifacts near Twin Arrows.

GOAL

Protect the county's historic, cultural, and architectural heritage.

POLICIES

16. The County encourages the preservation and celebration of cultural heritage as well as the protection of historic and archaeological resources.

17. The County supports the commemoration of local culture and heritage through the nomination of sites to the National Register of Historic Places,

public art, local exhibitions, and signage to direct and inform residents and visitors about historic places and events.

18. The County seeks to explore CLG status to enhance the protection of cultural and historic resources.

19. The County will support private efforts that protect cultural and historic resources whenever possible by sharing information, helping to coordinate activities, or making the most of existing programs and funding.

20. The County will explore establishing a historic preservation officer position to increase coordination between the County, federal agencies, and the tribal governments for cultural and historic resource awareness and protection.

HERITAGE AREAS & LANDSCAPE PRESERVATION

Several of the county's unique ***heritage areas*** and vast, uninterrupted landscapes have significant cultural and environmental resources that deserve conservation. Heritage areas include natural features, ***cultural landscapes***, cultural monuments, or historic trail systems; they may also reflect historic land use patterns. Coconino County is home to one of this nation's 18 World Heritage Sites—Grand Canyon National Park—designated by the World Heritage Committee of the ***United Nations Educational, Scientific & Cultural Organization (UNESCO)***. The county contains areas that could be eligible for designation as a National Heritage Area or Corridor such as Marble Canyon /Vermilion Cliffs, Oak Creek Canyon, Mormon Lake, Walnut Canyon, and others yet to be identified.

Since 2003, open space has been conserved using funding from the Arizona's Growing Smarter Fund, the County's parks and open space tax, and City of Flagstaff bond monies. This has resulted in the acquisition of nearly 5,000 acres of State Trust lands to become natural areas, including Rogers Lake County Natural Area, Pumphouse County Natural Area, Picture Canyon Natural and Cultural Preserve, and Observatory Mesa Natural Area. Future open space conservation should be coordinated between the County, agencies, nongovernmental organizations (land trusts), and private landowners.

GOAL

Conserve local heritage areas, cultural landscapes, and open space.

POLICIES

21. The County favors development projects that protect and incorporate cultural and natural resources features of the site and surrounding area.

22. High priorities for open-space conservation should consider heritage sites and cultural landscapes.

SCENIC VIEWSHEDS

As a significant factor in a community's overall character, natural scenery can have dramatic effects on property values and tourist revenues. As communities develop, it becomes increasingly important to conserve the unique features that distinguish an area—its rock formations, mountain backdrops, forests, ***riparian areas***, meadows, or expansive open spaces. To protect these resources, we need to understand how they are perceived by the surrounding communities. The first step in this process is identifying the resources, a step that requires public involvement. Tools that can help us achieve this goal include maps, field observations, surveys, and photographs (including aerial

Left: San Francisco Peaks.
COCONINO COUNTY PUBLIC INFORMATION OFFICE
Grand Canyon from the South Rim.

photographs). We can also compare past, present, and through simulation, future conditions. After identifying these resources, we can develop enhanced standards to maintain and enhance their scenic qualities.

The County needs to consider how proposed development affects scenic viewsheds. Residents have expressed concerns about cell towers, signage, aboveground utilities, and hillside development. The County is already addressing some of these concerns through ordinances such as the *Wireless Telecommunication Facilities Ordinance*, which provides guidelines for siting cellular towers and antennas. The County also prohibits new billboards or other off-premise signage. It regulates compatible signage through the *Design Review Overlay Ordinance* associated with the area plans for Doney Park / Timberline / Fernwood, Kachina Village, Mountainaire, Oak Creek Canyon, and Fort Valley through the formal permit-approval processes.

Furthermore, overhead electrical power lines for transmission and distribution create visual clutter on the landscape. The County's ***Subdivision Ordinance*** provides for regulation that requires all new subdivision development to have underground electrical facilities. Also, the County seeks to coordinate with electrical providers on the design and layout of transmission and substation facilities that may impact scenic corridors or unique features.

Development proposed for ridgelines may offer scenic views but can negatively impact surrounding residential and ***natural areas***. This highly visible development presents architectural and grading constraints that can impact an area's aesthetic and ecological values. Poorly planned roads and driveways leave permanent scars and may cause ***erosion*** problems. Structures built on steep slopes can appear massive and detract from the natural environment. Although, as of 2015, the County had no ordinance focusing on ridgeline or hillside development, the *Subdivision Ordinance* specifies requirements for buildable areas on steeply sloped lots, and the *Grading and Excavation Ordinance* addresses building sites and roadways.

Hillside development can be mitigated through sensitive architectural and site design techniques that help reduce the visual impact of hillside structures. These techniques

include using "step-down" designs, limiting the height of stem walls or piers, incorporating windows or vegetation, and excavating along landform or natural contours to reduce scarring, erosion, and other physical hazards. However, the most significant safeguard that a hillside development ordinance can provide is to avoid developing these areas at all.

GOAL

Conserve and enhance the integrity of the county's scenic resources and unique features.

POLICIES

23. The County supports the use of simulation technology and viewshed analysis when siting development projects affecting scenic corridors and unique features.

24. The County favors the underground placement of utilities in all major developments.

25. The County seeks to coordinate with electrical energy providers when siting transmission and substation facilities in the county.

26. To reduce impacts on views, structures and infrastructure shall be planned and built in a manner that minimizes impacts on horizon and ridgelines.

27. To maintain the county's unique natural beauty, the County supports the protection of viewsheds, undeveloped ridgelines, and hillsides through the use of sustainable building and development techniques.

28. The County seeks to explore options for developing an environmentally sensitive lands ordinance that would work to protect scenic viewsheds, protect native vegetation, and provide for minimal site disturbance.

29. The County supports the removal of nonconforming, off-premise signage.

SCENIC CORRIDORS

In 1982, Arizona enacted into law *ARS §41-512* through *ARS §41-518*. These laws provide for the establishment of parkways, historic roads, and scenic roads. The ***Arizona Department of Transportation (ADOT)*** is the agency responsible for implementing them. Subsequently, with the passage of the *Intermodal Surface Transportation Act of 1991*, the ***Federal Highway Administration (FHWA)*** established programs that officially recognize routes containing intrinsic scenic or historic features. One such program, the National Scenic Byway Program, provides for the establishment of both All-American Roads and National Scenic Byways for highways with outstanding scenic, historic, recreational, cultural, archaeological, and/or natural qualities.

These programs promote the creation and preservation of scenic roads by:

- Providing a current inventory of the scenic roads in this state
- Helping applicants preparing documents to designate new scenic roads
- Guiding the preparation of corridor management plans for scenic roadways

Coconino County has benefited from these federal and state programs, which recognize and give special designation to roads and highways in some of the most spectacular scenery in the Southwest. As of 2015, Coconino County can celebrate the designation of many

Oak Creek Canyon.

Scenic Highways and Historic Roads (*see the tables below and the Scenic Roads map at the end of this chapter*).

Designations are meant to promote tourism by educating the traveling public about the road's outstanding natural, historic, and visual resources. Grant funding is available for planning, enhancing, and promoting ***scenic byways***. Before designating a roadway as scenic, the FHWA requires a corridor management plan. Because the designation process must be initiated on a local level, this plan will help demonstrate that a community values its surrounding landscape and its cultural and historic features.

GOAL

Protect, conserve, promote, and enhance scenic corridors.

POLICIES

30. The County encourages corridor management planning for designated roadways and nominations of new scenic corridors in coordination with state and federal agencies.

31. Development projects along existing scenic byways must demonstrate compatibility within the standards of the scenic byway designation.

32. County seeks to develop standards for development along roadway corridors with state or federal designation.

Marble Canyon.

Arizona Scenic Roads

Road	Length (Miles)
Dine Tah (Among the People): Navajo Route 12 and 64	*100*
Fredonia-Vermillion Cliffs Scenic Road: US 89A	*82*
Historic Route 66 All-American Road (Ash Fork to Lupton): I-40, US 89 and US 180, Flagstaff City Highway, Coconino County Highway	*30*
Kaibab Plateau-North Rim Parkway National Scenic Byway: SR 67	*42*
Kayenta-Monument Valley Scenic Road: US 163	*28*
Naat'tsis'aan-Navajo Mountain Scenic Road: SR 98	*66*
San Francisco Peaks Scenic Road: US 180	*31*
Sedona-Oak Creek Canyon Scenic Road: SR 89A	*15*
Tse'nikani-Flat Mesa Rock Scenic Road: US 191	*45*

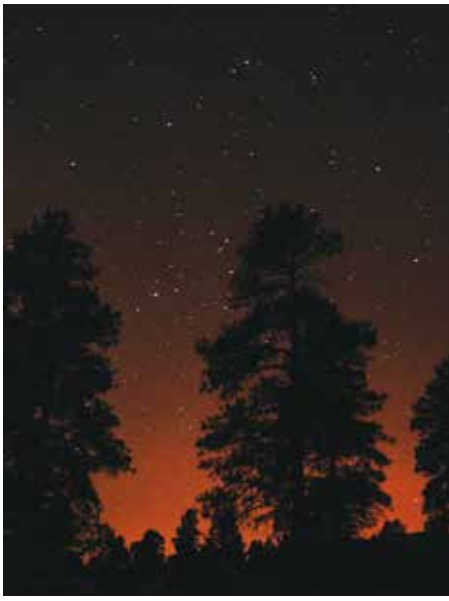
Arizona Historic Roads

Road	Length (Miles)
Williams to Grand Canyon to Cameron Highway: SR 64	*110*
Begins: *East of Williams @ MP 185.51*	
Ends: *South of Cameron @ MP 295.83*	
Jacob Lake to Grand Canyon Highway: SR 67	*42*
Begins: *Junction US 89A and SR 67 in the Town of Jacob Lake*	
Ends: *Grand Canyon NP North Rim @ end of SR 67*	
State Route 89A-Prescott to Flagstaff Highway	*81*
Begins: *Junction SR 89 / 89A near Prescott @ MP 317.85*	
Ends: *Junction I 17 and SR 89A near Flagstaff @ MP 398.94*	
Flagstaff to Cameron and Cameron to Bitter Springs Hwy: US 89	*106*
Begins: *Junction US 66 @ MP 418.37*	
Ends: *Bitter Springs @ MP 524.07*	
Bitter Springs to Fredonia Highway: US 89A	*87*
Begins: *Bitter Springs @ MP 524.07*	
Ends: *Fredonia @ MP 613.03*	

DARK SKIES

Coconino County is home to some of the highest quality and most accessible night skies in the world. Our star-filled night vistas are recognized worldwide, as iconic of Arizona as the Grand Canyon and the saguaro cactus.

County residents value star-filled night skies for their inspirational beauty. To ensure that our skies remain dark, the County and the City of Flagstaff have developed lighting ordinances that are among the most progressive in the U.S. One of the principal goals of these ordinances is to cap the overall amount of light and limit light trespass while allowing enough light for safety. Poorly designed lighting wastes energy and causes glare that decreases visibility and hinders public safety. Coconino County and Flagstaff have achieved worldwide recognition for their innovative leadership in the protection of dark skies. In 2001, Flagstaff became the first "International Dark Sky City." Since that time, the County has taken a leadership role in developing lighting codes that have been a model worldwide.



This premier natural resource has fostered substantial investment in professional astronomical observatories in the county, including the Anderson Mesa Station of Lowell Observatory, the Navy Precision Optical Interferometer at Anderson Mesa, the U.S Naval Observatory Flagstaff Station, and the Discovery Channel Telescope. This is especially significant because the number of quality astronomical sites in the U.S. is decreasing rapidly because of light ***pollution***. Coconino County is also home to artist James Turrell's "natural observatory" at Roden Crater, a celebrated, landscape-scale, perceptual-light project that relies heavily on naturally dark night skies.

GOAL

The County shall continue to be a world leader in the preservation of dark skies.

CHRIS LUGINBUHL

POLICIES

33. The County recognizes the economic and social benefits of dark skies by implementing innovative lighting practices and technologies on County projects and facilities and in the regulation of others through the application of its ordinances and promotion of best practices.

34. The County promotes the retrofitting of nonconforming lighting and the removal of inappropriate lighting and will explore incentives to do so.

35. Property owners are encouraged to install only the level of outdoor lighting necessary for safety, security, and utility purposes.

36. Full shielding of all outdoor lighting, installation of low-pressure sodium or "narrow-spectrum" (AlInGaP) amber LED fixtures, and the use of other best available technologies shall be encouraged and enforced through the *Lighting Ordinance*.

37. The County will explore the expansion of the dark sky protection zones to include natural areas, heritage areas, and other wilderness sites.

38. Areas near existing professional observatories or other dark-sky preservation areas shall be developed with special consideration for the impacts that development may have on dark skies.

39. The County will encourage a collaborative working relationship with neighboring Counties, state and federal agencies, sovereign tribal nations, and incorporated communities to protect dark skies in Coconino County and the surrounding region.

40. The County will work with partners, agencies, and other jurisdictions to minimize streetlights and their impacts on dark skies.

NATURAL QUIET

Another desirable community characteristic is natural quiet. Protecting natural soundscapes is becoming a serious issue in many national parks, natural areas, and tourist areas. Air traffic over the Grand Canyon, for example, has dramatically altered the natural soundscape of the park, affecting visitors, local residents, and wildlife. The NPS has worked to mitigate excessive noise in Grand Canyon National Park through policies that seek to protect, restore, and maintain a natural soundscape.

This issue is also important on a countywide level. On a daily basis, most residents are subjected to a wide variety of noise from roads, ***off-highway vehicles (OHV)***, aircraft, railroads, commercial and industrial land uses, and neighborhoods. Residents have expressed interest in developing a noise ordinance that implements time guidelines and reasonableness standards. Noise should be considered when reviewing plans for new commercial and industrial developments, especially those located close to residential, open space, or recreation areas. Transportation noise can be mitigated using landscaped buffers or increased setbacks in residential areas adjoining major arterials, highways, and railways.

GOAL

Preserve natural quiet and work to mitigate and reduce the effects of noise pollution.

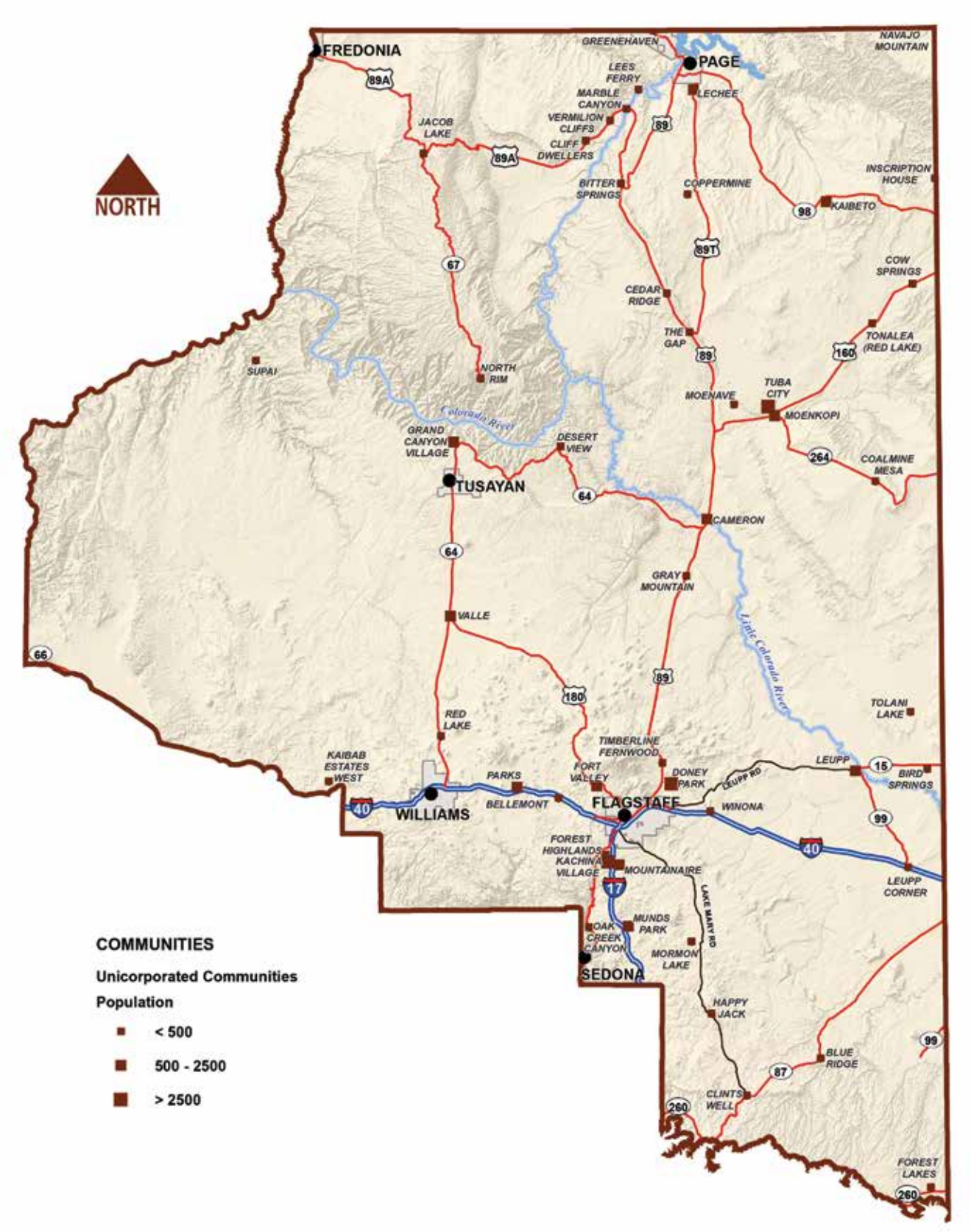
POLICIES

41. The impacts of noise generated by major commercial or industrial uses should be considered when reviewing development projects, especially when adjacent to residential and recreation areas.

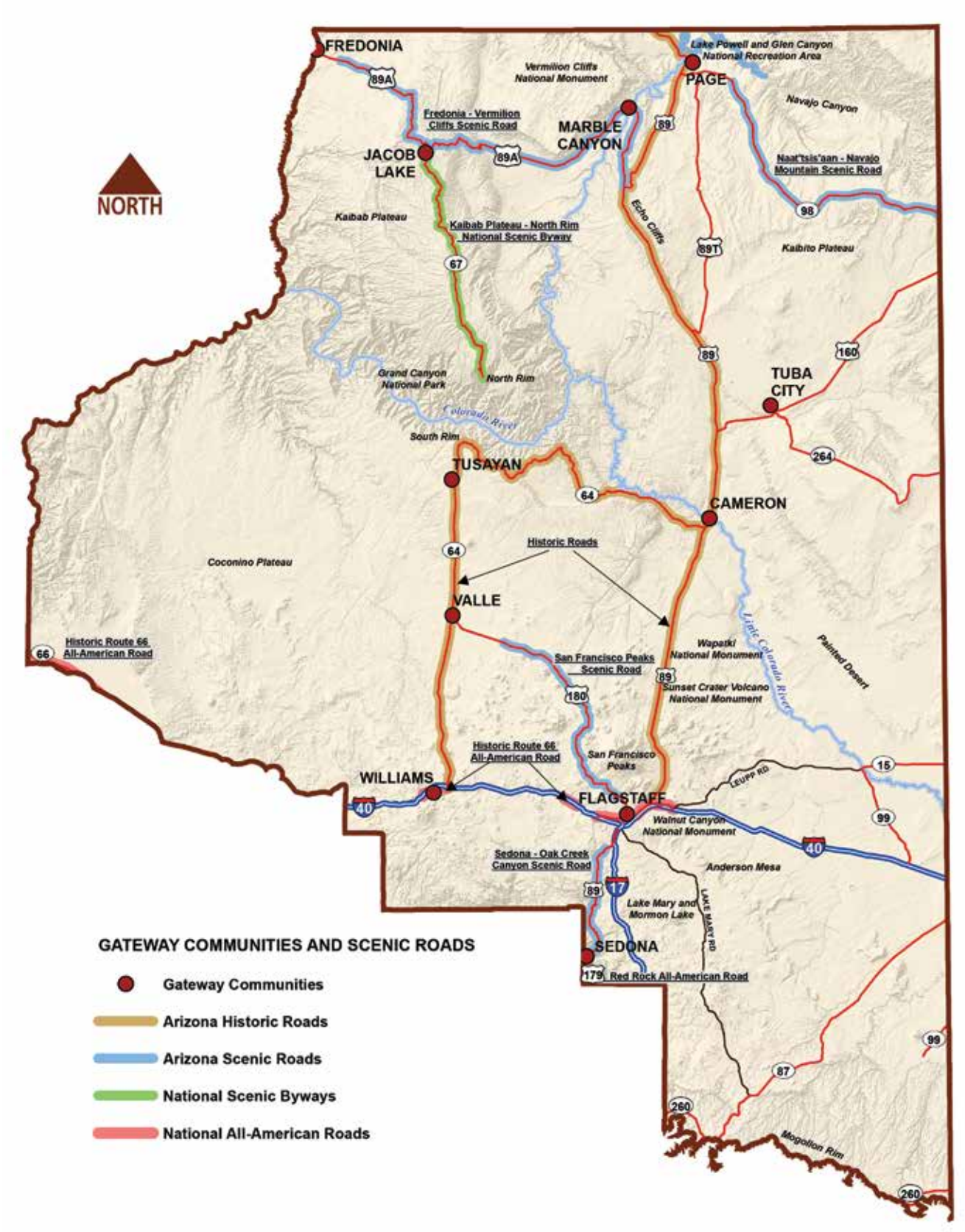
42. Major developments and subdivisions shall consider the impacts of adjacent noise generators such as highways, railways, and airports, and mitigate for those impacts where feasible.

43. In order to provide areas of natural quiet for all residents and visitors, the County supports efforts of local communities and the Federal Aviation Administration (FAA) to establish flight restrictions and no-flight zones over national monuments and wilderness areas.

44. The County shall explore the benefits of developing an ordinance related to noise and its impacts.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.



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Twin Arrows Casino.

Economic Development

INTRODUCTION

As the gateway to Grand Canyon National Park and home to four national monuments and portions of four national forests, the main economic drivers in Coconino County continue to be tourism, government agencies (federal, state, and local), hospitality, recreation and leisure, science, and research and development. In response to the economic downturn in 2007–2009, the County acknowledges the need to diversify its economic base, and it has taken steps to develop public-private partnerships and reduce barriers for new businesses entering the market. Awareness of land use in regard to economic development is important. Policies that promote shorter commutes, telecommuting, and neighborhood access to retail create strong communities, benefit the environment, and enhance the quality of life for county residents. Promoting businesses and industries that are compatible with our local environment and recognizing the economic value of natural systems and human capital creates a stable economic future. Moreover, it supports decision-making that considers a longer horizon for the benefit of today's residents and future generations.

The County strives to be cognizant of the constraints facing individuals and businesses related to jobs, housing affordability, services, infrastructure, and attracting and maintaining employment hubs. Supporting existing economic drivers, coupled with exploring new opportunities, will create a resilient, vital economy well into the future. This chapter

Top: Oak Creek Canyon.
Bottom: Forest Lakes.

examines existing economic conditions, pinpoints the county's strengths and weaknesses, and identifies goals and policies that promote diverse economic development and achieve a higher standard of living for our citizens.

ECONOMIC PARTNERS

The County is not alone in the task of fostering economic development. A number of partners actively assist small businesses and startup companies—the Economic Collaborative of Northern Arizona (ECoNA), Northern Arizona Center for Entrepreneurship and Technology (NACET), Sustainable Economic Development Initiative (SEDI), Flagstaff Chamber of Commerce, ***Coconino Community College (CCC)***, ***Northern Arizona University (NAU)***, and programs from other jurisdictions and entities.

MAJOR ECONOMIC DRIVERS

Tourism

Tourism continues to play a significant role in the economy of Coconino County. Grand Canyon National Park draws approximately 5 million visitors annually, and approximately 3 million people visit Oak Creek Canyon and Lake Powell. Other attractions, such as national monuments at Sunset Crater, Walnut Canyon, and Wupatki also draw large numbers of tourists. While ***ecotourism*** is already well established within the county, it can be expanded upon through a diversity of activities. Dark skies can continue to draw visitors from across the globe to view this threatened resource and visit internationally recognized observatories such as Lowell Observatory and the Flagstaff Station of the U.S. Naval Observatory. Continued protection of the natural environment and viewsheds is critical for ecotourism to thrive.

The County can support the diversification of tourism by promoting the emerging areas of ethno, agri, and educational tourism. Drawing visitors to experience historic, working

ranches and the rich culture of our indigenous people could help segments of our population bolster these areas outside of the urban centers and federal parks. The development of interpretive sites on the Navajo Nation will help foster ***ethno-tourism***. Traditional activities such as rodeos, pow-wows, and roadside vendors also support this economic sector. Coconino County's wealth of large working ranches and diverse opportunities for cooperation with government and tribal land managers should be embraced to promote new and established natural, ethno, and ***agritourism*** businesses.

Government

Coconino County is home to many governmental agencies that employ a large number of residents. These include, but are not limited to, the ***U.S. Forest Service (USFS)***, ***Bureau of Land Management (BLM)***, ***U.S. Geological Survey (USGS)***, and Cities and Towns such as Flagstaff, Williams, Tusayan, and Coconino County, among others. Many of these public-sector employees serve the citizens of the county by providing for and maintaining public spaces such as parks, forests, and ***landscapes***, which indirectly contribute to the recreation, tourism, and hospitality industries. They also maintain vital infrastructure and provide services that improve the quality of life for all county residents. Additionally, incorporated city governments actively work to attract and retain small businesses to their communities.

Hospitality

Hospitality includes lodging, food, and related services that serve both local residents and visitors alike. For residents, the hospitality industry provides job opportunities and contributes to the social fabric of communities. Central to tourism, the hospitality industry provides visitors with lodging and food as they travel. The hospitality industry is a significant generator of tax revenue in Coconino County.

In 2014, on the Navajo Nation, the Twin Arrows Casino Resort opened, creating jobs for the region and adding to the overall economy. Associated development and further gaming opportunities could provide additional economic benefit while being cognizant of the cost to the county for public services.

Recreation & Leisure

Outdoor recreation opportunities drive most of the tourism in the county, which in turn, provides 13,000 jobs and comprises the second largest employment sector[1]. Coconino County is home to nationally and internationally recognized trails, including the famed Arizona Trail, which stretches for over 800 miles from Mexico into Utah, with a major portion in the county. The City of Flagstaff has the highest number of outdoor recreational equipment shops (for example, skiing, hiking, and cycling) in the state per capita. Because of the vast amount of federal lands managed by the BLM, ***National Park Service (NPS)***, and USFS, residents and visitors benefit from incomparable recreational opportunities including river rafting, fishing, golfing, hunting, hiking, rock climbing, cycling, skiing, and snow play to name just a few. Hunting, fishing, and wildlife viewing alone are estimated to bring $325 million to the county annually[2]. There are annual festivals and markets, celebrating music, culture, and food that attract visitors and provide leisure activities for residents to enjoy. Since recreation and leisure are two of the main reasons people visit or move to Coconino County, it is important to foster the development of new businesses and support existing businesses in these industries.

[1] Arizona Department of Administration, Office of Employment and Population Statistics. 2014 Data.
[2] Arizona Game & Fish Department. 2013 Economic Impact of Fishing in Arizona. Study conducted by Responsive Management for the Arizona Game & Fish Department.

Northern Arizona University.

Science/Research & Development

The County recognizes that the Flagstaff region is one of the nation's leading bioscience centers. Innovation Mesa, NACET, and the Bioscience Tech Park at the Pulliam Airport help to cluster and support these industries. Clustering specific industries provides opportunities for their collaboration. Additionally, NAU is actively contributing to these industries through additional research, development, and skills training.

Additionally, Coconino County has the perfect environment to support astronomy and stargazing. High altitude, minimal development, and *Dark Skies Ordinances* position the county to take advantage of a unique economic opportunity. Lowell Observatory (credited with discovering Pluto in 1930) in Flagstaff, the U.S. Naval Observatory in Bellemont, and the Discovery Channel Telescope in Happy Jack are world-renowned and offer research opportunities for scientists as well as tourists. Existing and future investment in developing research facilities holds significant potential for expanding for this economic driver. Amateur astronomy is also very popular in Coconino County and is enjoyed by county residents and tourists. Enforcing the County's *Dark Skies Ordinance* will help ensure that the ability to view the stars on a commercial and individual level will continue to be an active part of the county's economy.

GOAL

Create and maintain a sustainable standard of living and a high quality of life by recognizing the economic value of the natural systems and human capital within Coconino County. Through collaboration, continue to embrace economic, social, and environmental responsibility to build prosperous and livable places.

POLICIES

1. Encourage innovative approaches to economic development that include job training and educational opportunities.

2. Increase its efforts to assist towns and rural communities with economic development using existing organizations including, but not limited to, SEDI, NACET, and ECoNA

3. Coordinate with economic partners to develop ongoing analysis of impediments to business attraction and retention.

4. Support tourist-related development projects that focus on conserving and showcasing the county's unique natural, cultural, and dark sky features.

5. Support coordinated efforts (public/private) to build and maintain recreational assets (trails, wildlife viewing areas) and continued access to public lands.

EMERGING TRENDS IN ECONOMIC DIVERSITY

E-commerce

Attracting and retaining new industries and small business can help diversify the economy to increase resiliency. Furthermore, the County recognizes that business opportunities will be found in new and emerging arenas. For instance, with the increase in e-commerce, retail brick-and-mortar businesses are shifting their locations from Main Street storefronts to light industrial sites for sales distribution, as customers are increasingly buying products online rather than from a physical store. Recognizing and adapting to new economic trends will benefit our residents.

Green Markets

Emerging environmental awareness and attention to efficiency is changing the way businesses make decisions from product development to processing, packaging, and distribution. Green markets are an emerging industry within the county. For instance, there has been an attempt to identify ***waste streams*** that can be turned into other resources or products that have both environmental and economic benefits. An example of this is the Four Forest Restoration Initiative (4FRI), which will thin millions of acres of forest and produce materials that will be removed, processed, and sold for a variety of uses including building and biomass fuels.

Home / Cottage Businesses

Home businesses allow for further diversification of the economy. These come in two forms, home occupations, which are invisible to neighbors, and cottage industries, which are slightly more intensive of a use and can raise concerns with neighbors. With oversight and performance standards, impacts to neighboring properties can be minimized or completely mitigated, resulting in a win-win for the business and neighbors. Working from home has proven to reduce traffic congestion, commuter travel time, and associated environmental impacts. The County must be ready to actively seek the expansion of broadband technology for high-speed Internet to support the expected increase in home occupations and cottage industries. Emerging markets such as the share economy and the success of businesses like Uber and Airbnb are already impacting Coconino County. Regulatory flexibility and open-mindedness for such businesses will position the County to take advantage of these emerging trends.

Public-Private Partnerships

Across the country, governments faced with tight budgets are developing long-term arrangements with the private sector to deliver services and develop infrastructure that is mutually beneficial for the partners. These partnerships can aid in providing effective and cost-efficient services that many public entities would struggle to provide on their own.

The County has developed public-private partnerships for event management and recreational facilities at Fort Tuthill County Park. These partnerships have resulted in the shared operation and management of the Fort Tuthill Pepsi Amphitheater, development

Top: Buying Native Art. COCONINO COUNTY PUBLIC INFORMATION OFFICE
Middle: Self-Storage at Red Lake.
Bottom: Iconic Country Store on Route 66 in Parks. ZACH SCHWARTZ

Local Businesses.

of the privately owned and managed Flagstaff Extreme on County land at Fort Tuthill, and the use of existing park buildings for the seasonal operation of the North Pole Experience.

GOALS

Ensure that policies and regulations provide flexibility and support for emerging trends.

POLICIES

6. The County should support and pursue economic development that maintains or improves the environmental and public health.

7. The County encourages emerging technologies and industries that utilize local resources in an environmentally responsible manner.

8. The County should recognize new business models and impacts to land uses when plans and regulations are developed.

9. The County supports the use of cost-effective, public-private partnerships to provide better public services and infrastructure.

BUSINESS GROWTH & SUSTAINABILITY

The development of diverse business sectors requires the need for added supportive industries and associated services and resources, including work force housing, education, medical care, and food, personal, and automotive services. These also contribute to strong economic growth.

Small Business

According to the Small Business Administration, "promoting small business development has higher potential for generating growth than any other economic development policy option." The County has supported the development of business activity centers in the region that provide cohort facilities, mentoring, coaching, micro loans, and other small business and entrepreneurial services. Home businesses are permitted in residential zones in response to the emerging trends supported by high-speed Internet connections and the lack of need for typical "brick and mortar" operations. Furthermore, there exist opportunities for micro-enterprise development, especially in areas with an employment base. With skills ranging from crocheting to food production to auto mechanics to sewing, a large population of potential entrepreneurs would simply need a small amount of startup capital, some retail and/or production space, and some business mentoring assistance to launch their enterprises. The County's Community Services Department works with the Basic Business Empowerment program, the Market of Dreams, and financially supports SEDI's efforts in this area. Additionally, Coconino County has taken aggressive steps to support the development of incubators that are providing support to startup businesses within emerging industries such as biosciences and renewable energy.

Educated Workforce

Many institutions and resources foster workforce development in Coconino County. Because human resources are so valuable in the 21st Century economy, the County provides life-long skills and learning opportunities by partnering with schools, post-secondary institutions, and other organizations for continuous education and training. These include, but are not limited to, CCC, NAU, and many varied trade schools. NAU is a state university with emphasis in the fields of physical therapy, hospitality, forestry, and natural sciences. County residents who pursue training with these

institutions are better prepared to enter the workforce and more likely to obtain employment and earn higher wages. This improves the quality of life for those residents, both on an individual level and as a whole, since increased spending power within the county stimulates the entire economy. Furthermore, employers who offer professional-level jobs and careers prefer to locate in areas with a highly educated workforce. This is especially true in fields such as bioscience and technology, which are currently well based but growing fields within the county.

Additionally, the County Community Services Department and the Career Center Department offer workforce training and business empowerment classes. Startup grants are available through the Community Services Department and business empowerment classes are available through SEDI.

Standard of Living

In 2014, Flagstaff's average hourly wage was just under $17. However, cost-of-living expenses drop that number to $14.31, which is $8 below the national adjusted average.[3] There is little data showing that other areas within Coconino County are as harshly affected by lower wages and higher costs of living as Flagstaff; however, since the Flagstaff metropolitan area is the largest economic activity center in northern Arizona, its economy has a large effect on Coconino County in general. Many people work within the limits of the City of Flagstaff and live in the unincorporated parts of the county for reasons related to housing affordability. Support for high-wage jobs and careers will boost the economy for all county residents.

Coconino County Economic Statistics

	Coconino County	Arizona	United States
Median Household Income	*$49,555*	*$49,774*	*$53,046*
Median Home Value	*$220,400*	*$165,100*	*$176,700*

Source: American Community Survey, 2013

Economy & the Environment

Economic development and environmental stewardship are ideas that work hand-in-hand in Coconino County, where a large variety of businesses thrive because of the unique and beautiful natural environment. Since so many economic opportunities depend on the environment in Coconino County, it is imperative that the County support economic development that is consistent with the goals and policies of this Plan and that seek to thrive in a healthy environment.

GOAL

Encourage and support business growth and sustainable business practices.

POLICIES

10. Support business development that creates long-term, stable, economic growth.

[3] Department and Council for Community and Economic Research compiled by Governing magazine http://knau.org/post/flagstaff-average-hourly-wages-lowest-us

11. The County recognizes the challenges faced by local small businesses in competing in a global market place.

12. Support increased and improved post-secondary educational opportunities throughout the county.

13. Identify impediments and opportunities for an educated workforce.

14. Support existing and new business development that provides for higher-wage employment opportunities.

15. Seek businesses that are compatible with the environment and benefit their communities.

INFRASTRUCTURE

Infrastructure—for transportation, utilities, and communication—is critical to businesses. A successful business needs to be able to transport employees and goods efficiently. Utilities and ***wastewater*** systems are needed to support the production of goods and the people who work on site. Excellent communication systems are required to operate in a global economy. Coconino County is not an infrastructure developer, and this affects how and which businesses develop in unincorporated areas. Limited infrastructure presents challenges to economic development. It is often the responsibility of private enterprise to develop and maintain its own infrastructure. Developing such services can be costly and inherently limit some enterprises. In some cases, finding properties in or adjacent to incorporated areas of the county may provide opportunities to reduce infrastructural costs to private entities.

Transportation

The county has several major transportation assets connecting the local and national economies. Interstate 17 connects the county south to Phoenix and Interstate 40 connects the county east-west across the entire nation. The BNSF railroad provides cost-efficient transportation of goods. Pulliam Airport, located in the Flagstaff area, along with other smaller airports, offers services to residents and tourists. I-40, rail corridors, and the proximity to west coast ports make areas of the county strategic locations for industrial, warehousing, and manufacturing activity. In addition, scenic highways help support our thriving tourist economy and regional airports bring travelers and business people. Expansion of flights locally would help attract businesses that need access to the global economy.

The County does not build roads, but it does maintain those that are accepted into the Road Maintenance Program through Public Works. Building new roads, expanding roads to accommodate new development, and maintaining roads that are not maintained by the County are the responsibility of developers and homeowner associations and road improvement districts. ***Arizona Department of Transportation (ADOT)*** builds and maintains many roadways within the county. Partnering with ADOT for high-quality levels of service is critical.

Recently, the collapse of State Route 89A south of Page demonstrated the importance of transportation infrastructure in the county. Beyond the expense of repairing the road, the negative economic impact on businesses in Page and the communities of Marble Canyon, Cliff Dwellers, and Vermilion Cliffs has been significant. Another example of the importance of transportation infrastructure is the limited capacity of the I-40

interchange at Bellemont. Together, these examples show the importance of interagency communication and cooperation. Additionally, the County needs to maintain and upgrade transportation infrastructure to minimize future disruptions to the economy.

Bellemont Truck Stop.

Water / Wastewater

Water is another limiting factor for economic development in the county. Because the County is not a water provider, businesses must be able to secure their own. For this reason, water-intensive businesses will likely never be a part of our economic portfolio. Additionally, wastewater systems can be costly. Businesses with needs beyond standard septic systems often find these costs prohibitive.

Telecommunications

Telecommunications infrastructure is critical to business. Transformative technologies in wireless and broadband systems are now standard infrastructure expectations in the business environment. Many parts of the county have no phone service at all, let alone Internet capabilities, and many places that do have services are limited. The County can support the development of telecommunications systems through appropriate zoning regulations.

GOAL

Work with businesses to assess infrastructural needs and support improved infrastructure and systems throughout the county.

POLICIES

16. Promote improved air transportation schedules and connectivity to enhance an environment that will retain and attract business.

17. Support education and employment opportunities by working with communities to assess telecommunication needs.

18. Support infrastructure improvements to enhance rail, highway, and air transportation.

19. Coordinate with regional economic development organizations to create a business development ombudsman to help individual businesses with their siting and infrastructure needs.

20. The County will work with businesses to identify ways to reduce water and wastewater needs associated with development.

COORDINATION WITH LAND USES

Land use and regulation impact business development and attraction. The County is proactively trying to help give developing economic sectors flexibility for choosing locations by updating the *Zoning Ordinance and pursuing land use best practices.*

Opportunities are plentiful for industrial economic development, especially in the Bellemont area. To support future development, investments would have to be made for

Meteor Crater.

upgraded roads, water, and wastewater infrastructure to fully use industrially zoned land parcels. Additional opportunities may exist in areas that are undeveloped or not zoned for commercial and/or industrial uses, such as the I-40 corridor east of Flagstaff toward Winslow. In Williams and Fredonia, land suitable for new commercial and industrial activity underwent annexation to provide infrastructure and capture tax benefits for the municipalities.

Zoning

Rezoning is a tool that can be used to expand commercial and industrial uses when tied to viable development projects. The County opposes speculative zoning, as there can be unintended negative consequences, including deterring development by artificially inflating value of undeveloped properties. Instead, the County encourages developers to identify appropriately zoned parcels for the projects. If no appropriate properties are available, then developers may seek project-specific rezoning. The rezoning process requires an analysis of impacts, consistency with the *Comprehensive Plan* and any area plans, and public input to determine if indeed the location is appropriate.

The County also encourages the ***adaptive reuse*** of vacant buildings and underutilized properties. Adaptive reuse can provide positive economic, social, and environmental outcomes. With a limited supply of private land, it may also provide additional opportunities for locating businesses.

Our transportation corridors are crucial to a thriving economy. They are the obvious place for continued development because of their location along shipping routes, providing potential for logistics and distribution hubs. Much of the existing commercial and

industrially zoned land in the county is found along such corridors. The County supports development near these corridors but opposes strip-style development, which can impede traffic, impact viewsheds, and limits opportunities for multimodal transportation. Instead, clustered commercial and industrial development in designated ***activity centers*** with access to major corridors is preferred.

Jobs/Housing Mix

Housing affordability and wages in Coconino County present challenges for workforce attraction and retention. Less than half of Flagstaff households can afford a median-priced, single-family home; many spend far more than one-third of their income on housing. While Flagstaff is the economic hub, other outlying areas face similar housing dilemmas that limit the relocation of new businesses into outlying communities. The "Sustainability" and "Land Use" chapters of this Plan address housing affordability. However, attracting new employers that pay an acceptable, ***livable wage*** is still an issue and can be improved by the goals and policies in this chapter.

Locating work place and housing in closer proximity can reduce travel times and dependency on single-occupancy commutes, thereby reducing gasoline consumption and improving overall affordability. Many households have two or more residents with jobs in different locations. For example, although housing has been developed near industrial areas in Bellemont, those residents will likely work in Flagstaff. The current *Zoning Ordinance* does allow for mixed uses under the planned residential development and planned community zones; however, in the future it may be possible to create additional ways to accommodate mixed-use zoning, especially in light of all of the economic and environmental benefits of such developments.

GOAL

Incorporate innovative planning techniques to encourage the development of compatible enterprises with neighboring land uses.

POLICIES

21. The County encourages the establishment of industries that contribute to the region's economic health and support community character.

22. Focus development for economic clustering through flexible zoning regulation in industrial and commercial zones.

23. The County supports new industries that practice conservation measures to minimize impacts to natural and cultural resources.

24. Existing area plans should identify activity centers that promote economic health. Appropriately scaled, these activity centers should help communities create a quality of life that is attractive for business retention and preserves a local sense of place.

25. Create an inventory of commercial and industrial zoned land, and corresponding compatible land uses, for which those businesses and industries could locate. This inventory should be made available to the public.

26. The County should be a clearinghouse for information about available parcels and infrastructure.

Left: Colorado River from Navajo Bridge.
Top: Camping in the Coconino National Forest.
Bottom: Lake Powell. COCONINO COUNTY PUBLIC INFORMATION OFFICE

Parks, Open Space, Trails, & Recreation

INTRODUCTION

With exceptional features like the Grand Canyon, Oak Creek Canyon, Glen Canyon National Recreation Area, Lake Powell, and national forests and monuments, Coconino County has Arizona's highest visitation rate to outdoor parks and recreation areas. As further detailed in the "Economic Development" chapter, outdoor recreation is a driving economic force in Coconino County. As such, the County has a great deal invested in outdoor recreation and it should continue to develop both ***active recreation*** and ***passive recreation*** opportunities in the form of a system of ***parks***, ***trails***, and ***open space***. Outdoor recreation has become increasingly popular because people recognize not only the health benefits of a longer and higher quality of life, but also the economic benefits to property values and the environmental benefits of protecting biodiversity and ecological health.

According to Arizona's *2013 Statewide Comprehensive Outdoor Recreation Plan (SCORP)*, the favorite outdoor activities are all generally nature-based—running, biking, bird-watching, fishing, and hiking. These activities are all well represented in Coconino County.

Coconino County's outstanding scenery and healthy natural environment attract people who enjoy its diverse recreational opportunities many historic and ***cultural sites***. As the county's population increases, there will be a greater need to maintain adequate open space and recreational opportunities that address growing trends while minimizing the potential for overuse. Key issues include addressing ***wildland / urban interface (W/UI)*** conflicts; accommodating diverse uses; protecting natural, historic, and ***cultural resources***; conserving ***habitats***; and ensuring that management agencies cooperate with each other. The goals in this chapter reflect the vision of a highly integrated system of active and passive recreational areas and facilities that have been developed using creative practices, including public/private partnerships. These opportunities are intended to serve local residents and the 7.1 million Americans[1] who visit the region and its network of parks, open spaces, and natural areas annually. Policies in this plan also focus on providing recreational access via a trail system that serves communities, public lands, and activity centers while supporting the integrity of ***ecosystems*** through the sensitive design of linkages that serve people and wildlife. Furthermore, the policies in this Plan strive to promote our need for diverse recreational opportunities while preserving the county's scenic character **and ecological systems.**

Left: Louise Yellowman County Park. COCONINO COUNTY PARKS AND RECREATION
RIGHT: Coconino County Fair. LIZ KRUG

COUNTY & NEIGHBORHOOD PARKS

The County Parks & Recreation Department envisions providing a variety of recreational and educational experiences. Many of the desired experiences will be provided through creative partnerships with outside entities. It is intended that quality and sustainable facilities and services be provided while protecting natural and historic areas.

As of 2014, the County owned and/or managed the following and County Natural Areas (CNAs): Fort Tuthill, Raymond, Louise Yellowman, Sawmill, Peaks View, Cataract Lake, Pumphouse, and Rogers Lake (*see the Coconino County Parks map at the end of this chapter*). Park facilities offer a wide variety of opportunities. For example, the County manages equestrian stables, a campground at Fort Tuthill, the annual county fair, ramada rentals, an outdoor performing arts amphitheater, and recreational trails. The CNAs, on the other hand, are meant to conserve natural spaces and have minimal

[1] 2013, Arizona Office of Tourism

Left: Rogers Lake. COCONINO COUNTY PARKS AND RECREATION
RIGHT: Mountain biking. COCONINO COUNTY PARKS AND RECREATION

facilities beyond trails and interpretive sites. County parks should be managed to encourage use by people of all ages and physical abilities. Management plans are a useful tool to ensure that parks are used to their fullest intended potential. The management plans for Rogers Lake and Observatory Mesa were created through collaborative planning and stakeholder-driven processes. Additionally, in 2012, the *Fort Tuthill Master Plan*, approved by the ***Board of Supervisors (BOS)***, will guide development within that park.

The County's venture into public-private partnerships on park facilities has been successfully implemented at Fort Tuthill County Park, where Flagstaff Extreme operates an adventure ropes course on park property April–October. Likewise, the North Pole Experience also operates seasonally on site during the winter holiday season. The County seeks additional public-private partnerships to add value to public facilities and offer an expanded array of recreational opportunities for residents and visitors.

In 2002, voters approved a sales tax to fund the ***Coconino Parks and Open Space Program (CPOS)*** with $33 million for parks and trails projects. As of 2014, CPOS has successfully completed the development and redevelopment of parks and the acquisition of natural areas including the Pumphouse and Rogers Lake CNAs. CPOS made possible the redevelopment of Raymond County Park in Kachina Village and Cataract Lake Park in Williams, as well as the development of Louise Yellowman County Park in Tuba City. Additional improvements in existing parks were also completed, including the amphitheater at Fort Tuthill and facilities at Sawmill and Peaks View County Parks. *The CPOS tax sunset on September 30, 2014, leaving the County to seek other funding options, including* ***user fees***, to manage and operate facilities and programs.

Neighborhood parks, which may be public or owned and operated by homeowner associations or neighborhood groups, are developed sites that feature active recreation facilities such as sports fields, basketball courts, skate parks, and playgrounds. These parks are community amenities that provide places for holding events and for family gatherings, exercise, and relaxation. They can also offer educational opportunities through interpretive signage and experiential programs that enhance the visitor's experience. Providing nonvehicular pedestrian and bicycle-trail connections between neighborhoods, parks, and the greater county network of trails and open spaces is important for quality of life. The *Flagstaff Area Open Spaces and Greenways Plan (FOSGP)*

addresses connectivity and linkages for the next stage of growth in both the urban and rural areas of the county.

It has been documented in several studies that the value of a home and the appeal of a neighborhood will increase it is when located near parks and open space. A 2009 study by the National Association of Realtors found that there was a premium for homes near parks and open space. According to the "proximate principle," the market value of a home located near a park, trail, or open space is frequently higher than those farther away. The increase in value is approximately 20% for properties that lie adjacent to the open space. Parks and open space not only provide opportunities for physical activity, but they also contribute economic benefits to residents and local governments.

In existing developments, neighborhood parks can be created by designating nearby open space for recreational park use; alternatively, this open space can be left in its natural state. For new developments, the creation of neighborhood parks and retention of open space is addressed through the planning and zoning process.

In 2009, the County developed the *Parks & Recreation Organization Master Plan* to determine future needs for parks and open space. It included a *Development and Action Plan* for the next 10 years. Based on this plan, the County seeks to expand parks only if it can do so while maintaining existing facilities. Additionally, a Parks & Recreation Commission advises the BOS regarding the development and operation of a well-balanced park system. Management plans should be developed for new facilities to establish consistent, high-quality maintenance, operations, and use standards. Such standards will help certify the County as a nationally accredited parks and recreation program.

GOAL

Plan for and provide a variety of recreational, cultural, historic, and educational opportunities throughout the county, in developed and future parks as well as natural areas.

POLICIES

1. The County shall strive to model exemplary service levels and conservation practices in park and facility development, management, maintenance, and operations.

2. The County shall strive to secure reliable funding to ensure adequate resources for parks, trails, and natural areas.

3. The County will explore a variety of alternative development and management methods, including collaborative efforts, to reduce the costs of acquiring and managing facilities and land.

4. In order to ensure that needs of residents are being met, public input will be sought and considered in the development of new park plans, the acquisition of open space, and trails planning.

5. The design of developments should include public recreation amenities.

OPEN SPACE & PUBLIC LANDS

Open space on public lands comes in many forms in Coconino County including ***natural areas***, designated ***wilderness areas,*** forest and BLM lands, and national parks and monuments. Virtually all federal lands surrounding existing communities are managed

Left: Hiking amidst fall Aspen. COCONINO COUNTY PUBLIC INFORMATION OFFICE
Right: Watchable wildlife. LIZ KRUG

and retained as natural open space and are important for recreation. In addition, wilderness areas and lands managed by the NPS and BLM draw national and international attention as tourism destinations.

Natural areas are places that emphasize the conservation of natural resources and cultural sites and may include linear ***greenways***. They are ideal for passive recreation activities, which may feature amenities such as hiking trails, picnic tables, wildlife observation areas, and ***interpretive education*** experiences. For example, the Arizona Watchable Wildlife Experience[2], a passive recreation activity, has established more than 30 watchable wildlife locations in Coconino County. These designated locations—areas of high wildlife use—offer interpretive signage, viewing platforms, and other amenities. The program has been quite popular with organized events and with the addition of smartphone apps and audio tours.

CPOS and the ***Arizona Preserve Initiative (API)*** have funded the acquisition of State Trust and other lands identified as "high priority for retention as open space" by the FOSGP. These lands, which lie outside of Flagstaff's ***urban growth boundary***, comprise much of the scenic viewshed and include several natural areas within 3 to 10 miles of the Flagstaff city boundary. The County intends to continue seeking opportunities, including partnerships, to conserve future open space.-

As the County looks towards the next decade of open-space planning, consideration should be given to renewing the FOSGP to identify the next generation of priority open spaces and natural areas. A renewal of the FOSGP under a joint partnership would support the continuation of coordinated efforts amongst jurisdictions, local residents, scientists, and public land agencies and organizations to identify lands with the most significant resources and to seek funding for conservation efforts. Connecting the county's

[2] Information on these sites can be found at http://www.azwatchwildlife.com

numerous and widespread natural areas, open space areas, monuments, wilderness areas, and recreational areas as a network fulfills the FOSGP vision of providing access to designated trails and open spaces within a 15-minute walk. Extending this concept to the entire county, we envision nodes of recreation and open spaces connected by a system of trails and greenways. The connectivity between nodes of open space is a cornerstone of this idea as well as having access points through local communities. This idea can be expanded to include a cohesive network of public lands and recreational attractions connected through ***scenic corridors***.

The County seeks to work with other jurisdictions and public land managers in a coordinated manner to develop plans that support a shared network for enhanced recreational opportunities. To that end, Coconino County as a leader in parks and recreation, promotes the renewal of FOSGP with partners across the recreational spectrum to provide enhanced recreation, economic development, and public enjoyment.

GOAL

Provide for the conservation and stewardship of important natural areas and support the protection of other public lands that provide open space and recreation value.

POLICIES

6. The County supports the conservation of important natural resources through collaboration in acquiring, managing, and interpreting natural areas.

7. The County encourages the protection of environmentally sensitive features, cultural resources, and cultural sites located in natural areas or on public lands.

8. The County supports access to open spaces for all residents and visitors where suitable.

9. The County supports a scenic corridor approach to connecting and growing the existing system of natural areas and public lands.

10. The County shall manage the recreational use of County-owned lands in a manner that reduces negative impacts to communities and the environment and increases opportunities for educational and economic benefits.

11. The County strives to connect open space and places of recreation with a system of greenways and trails to create an interconnected recreation network.

12. The County promotes the renewal and expansion of the FOSGP to include partners from across the county for a multi-agency, multijurisdictional effort.

TRAILS

As noted above, trails connect people to parks, wilderness areas, open space, neighborhoods, schools, shopping, and work. They are popular for recreation, exercise, and commuting and are used by walkers, equestrians, hikers, backpackers, runners, birdwatchers, and bicyclists. The County currently provides recreational nonmotorized trails that connect to trail systems in the Flagstaff region. This type of planning for diverse outdoor recreation opportunities can be enhanced by developing a network of trails throughout the county. The trail system discussed above is greatly supported by having so many areas that can serve as anchors, such as the Rogers Lake CNA, Picture Canyon National and Cultural Preserve, Grand Canyon, and Vermilion Cliffs National Monument.

Large pockets of open space have long been attractions for tourists and trails are becoming increasingly attractive to tourists as well. For example, the Pacific Crest National Scenic Trail and the Appalachian National Scenic Trail bring millions in revenue to the small communities that act as ***portals*** located along their paths. Potential hiking and biking trails along existing routes connect Flagstaff to other regions of the state and to local attractions such as the North and South Rim of the Grand Canyon; these trails could yield similar or greater economic impacts. Arizona's own National Scenic Trail, the Arizona National Scenic Trail, which extends from Mexico to Utah and passes through eight designated wilderness areas, offers a unique opportunity to position Flagstaff as a portal city for hikers and backpackers. The Behnam, Bright Angel, North Kaibab, Parks Rest Area, River, and South Kaibab trails are all designated National Recreation Trails within Coconino County. The Great Western Trail may be best known to ***off-highway vehicle (OHV)*** users but could be expanded for other users as well. The popularity of such trails, both nonmotorized and motorized, may be increased by access to services such as campgrounds, hotels, stores, and restaurants at portal points along trail routes. Having a variety of experiences and accessibility to the remote and pristine can round out Coconino County's already robust environmentally based economy.

The County's most recent inventory recorded 168 trails countywide, excluding user-created ***social trails*** that are not recognized or maintained by a land management agency. Ninety percent of the inventoried trails are managed by federal agencies such as the ***U.S. Forest Service (USFS)***. Twenty percent of primitive trials (hiking or equestrian) lie within designated wilderness areas that are closed to bicycles. Only 17% percent of the County's trails are considered urban or commuter trails and most of these are part of the ***Flagstaff Urban Trails System (FUTS)***. The results of the inventory also indicate that most trails are managed for backcountry recreation and may be too challenging or remote for many, reflecting a need to provide a wider range of opportunities for varying skills and activities in areas closer to where people live. To increase usability for more people, focus should be placed on upgrading more trails to the usability level of the urban trail system.

The W/UI is of particular concern as social trails may evolve and create a maze of routes through the forest and adjacent neighborhoods. These user-created trails are not maintained and are often poorly located, leading to unwanted erosion and scenic impacts as well as disturbance to wildlife and their habitats. The 2012 Kelly Motorized Trails system, which includes a broad spectrum of motorized recreation opportunities between Munds Park and Flagstaff, is an exemplary project for managing these impacts. Additionally, the Munds Park Roads and Trails System, completed in 2005, is also a model for managing the impacts of social trails. The plans for these systems resulted in creating designated ***trailheads*** or forest access points, removing unwanted trails, improving existing trails by relocating or redesigning them, establishing a logically connected system of trails with clear destinations and linkages, and implementing a signage system.

Trail and forest or park access needs should be addressed before approving subdivisions or other large development. Developers submitting proposals should work with the County's Community Development Department, Parks & Recreation Department, federal agencies, sovereign tribal nations, and/or other management agencies to address these needs. In many cases, access can be provided through ***trail easements*** to connect developments to adjacent forestlands and natural areas and parks.

Hiking in Coconino County.
TOP: SARA WAGNER
BOTTOM: COCONINO COUNTY PUBLIC INFORMATION OFFICE

Historic trails are a unique resource that recounts the travels of early explorers and settlers. These trails enhance tourism, provide educational and recreational opportunities, and commemorate the county's unique history. Some of the earliest known trails in the county trace the migration corridors of native peoples and the exploratory routes of the Spanish, missionaries, traders, prospectors, soldiers, and settlers. Many of these original corridors were transformed into wagon routes, recreation trails, ranching roads, highways, or train corridors. As of 2014, the only National Historic Trail in Coconino County is the Old Spanish National Historic Trail, which meanders through portions of the Arizona Strip in Coconino and Mojave Counties and terminates in St. George, Utah. The Native American routes that traverse parts of the county are also important resources. One such trail is the Salt Trail, which members of the Hopi Tribe use to enter the Grand Canyon. Only a handful of these Native American trails are known to the public.

Of the 21.5% percent of Arizonans who consider themselves motorized trail users, nearly half believe that the greatest issue is lack of access to trails. Considerable OHV use occurs on lands managed by the USFS, ***Bureau of Land Management (BLM)***, and the ***Arizona State Land Department (ASLD)***. OHV users are motivated by the opportunity to observe scenic beauty, enjoy nature, access hunting areas more easily, and access more remote areas. OHVs also provide access for people with limited mobility. OHV use has increased in recent years within the county and has sometimes resulted in resource degradation and conflict between different outdoor user groups.

The Kaibab and Coconino National Forests have updated their travel management plans in the last 5 years and are on track to review and revise them every few years. The emphasis has been on reducing the negative impacts to sensitive natural resources while facilitating public access throughout the forests. While off-road travel is prohibited in the national forest, it does sometimes occur and result in significant damage. The key to OHV management is educating people about responsible use, providing designated use areas within environmentally and socially appropriate locations, and effectively enforcing OHV laws. This will be possible through improved communication, coordination, and support among agencies and users.

GOAL

Enhance the existing regional system of trails by promoting more access and managed access between communities, public lands, and activity centers to create a network of linked open space, trails, and recreational areas.

POLICIES

13. The County supports a comprehensive approach to addressing the need for public lands access, continuity of trail networks, provisions for nonmotorized circulation, and resource protection through community trails plans.

14. The County supports coordination with local communities to identify and develop portal points into the trails and open-space system that will promote access to high-value recreation and scenic lands.

15. The County supports the protection of environmentally sensitive features, cultural resources, and cultural and historic sites. To this end, trail design should consider accommodating an appropriate level of use while minimizing negative impacts to all types of resources.

16. Development projects must consider and plan for public land access and the design and maintenance of proposed trails, trailheads, and bicycle lanes that meet County guidelines.

17. In coordination with developers, community groups, land management agencies, and the ASLD, the County encourages regional planning of nonmotorized circulation infrastructure and facilities such as trails and bike lanes that link destination areas, community activity centers, and, where appropriate, designated access points to public lands.

18. The County shall seek opportunities to enhance roadways by the addition of trails separated from travel lanes.

19. The County seeks to elevate the status and use of existing trails such as the Arizona National Scenic Trail or The Great Western Trail and promotes new routes linking areas of open space and high recreational value.

20. The County supports efforts, including public education, by state and federal agencies to plan for and manage OHV use on public lands.

21. The County will continue to require open space and trail development to access parks, schools, neighborhoods, community forums, and markets, and to encourage exercise and promote general wellness as part of the community planning process.

22. The County shall require new subdivisions to provide access to designated motorized and nonmotorized trails on adjacent public lands when feasible.

23. The County supports the removal and rehabilitation of user-created, nondesignated trails (both motorized and nonmotorized) that result in unauthorized access and/or damage to adjacent private and public lands.

Ranger talk at Grand Canyon National Park.

RECREATION: PARTNERSHIP & COORDINATION

Most public recreation and open spaces in the county are managed by the federal government through the USFS, BLM, and ***National Park Service (NPS)***. Additional lands are managed by Arizona State Parks, Coconino County, local municipalities, or tribal nations (*see the Open Space and Recreation Areas map at the end of this chapter*). The NPS manages a variety of sites, including national monuments and parks. The BLM and USFS manage vast amounts of undeveloped lands, including wilderness areas such as Kachina Peaks, Red

Rock Secret Mountain, Sycamore Canyon, Paria Canyon, Vermilion Cliffs, and other congressionally designated sites. Additionally, because of the checkerboard nature of land ownership between private and State Trust lands, ranchers often provide access to their lands for recreational purposes, which is particularly important to hunters.

Future planning to support existing facilities and provide for enhanced opportunities will require a coordinated effort amongst recreation providers. Partnerships will be essential to identify, protect, and interpret historic routes and trails that cross jurisdictional boundaries. The County is in a unique position to help coordinate land managers, trail users, neighborhoods, developers, and interest groups in finding common solutions for expanding recreational opportunities while protecting resources. Creative solutions will require innovative funding mechanisms. The Arizona Watchable Wildlife Experience is a prime example of the type of collaborative partnership between the County, City of Flagstaff, ***Arizona Game & Fish Department (AGFD)***, Arizona Wildlife Federation, and USFS that has proven very successful in expanding outdoor opportunities within open space using shared resources and grant funding.

Snow play at Fort Tuthill. LIZ KRUG

Another recreational activity that requires interagency coordination is finding appropriate locations for snow play. This winter activity is becoming increasingly popular in County parks and on public lands. While this activity brings economic stimulus to higher elevations within the county, traffic congestion and safety has been a major concern. During winter months, crowds from the central portions of Arizona drive to the mountains to play, often stopping along highways as soon as they encounter a snowfield. Several snow play sites have been established on USFS lands, which provide safer locations for this activity. Recently, the County established a multijurisdictional, multi-agency committee to address issues regarding snow play in the Flagstaff region. Some solutions proposed include the potential for snow play on County properties such as at Fort Tuthill County Park and other areas such as Blue Ridge and Forest Lakes on public lands. The County continues exploring ways to provide access to snow play in a safe and enjoyable environment.

To achieve desired objectives for expanding recreational opportunities connected to parks, trails, and open space, a collaborative should be established to oversee the planning, management, and funding for such a system. The FOSGP could serve as a foundational plan on which to build partnerships and goals and policies for a county-wide system. It could also work to establish unique funding sources such as an open-space donation fund or special districts or to obtain grants. This collaborative approach could optimize the funding and coordination of projects.

GOAL

Build upon the cooperative opportunities between county, federal, and state agencies; sovereign tribal nations; cities; and private land managers to increase the outdoor tourism economy while conserving high-value natural and cultural resources in the county.

POLICIES

24. The County will promote and support partnerships between trail managers, trail users, neighborhoods, government, and tribal nations to improve trail safety and access, user information, volunteer stewardship, and connectivity of trails.

25. The County will coordinate with the ASLD, Arizona Department of Transportation (ADOT), and tribal nations for the acquisition of easements to provide and enhance connectivity between areas of high resource and scenic value.

26. The County will seek regional partnerships, or other management opportunities, to focus on connectivity between existing open spaces across jurisdictions.

27. Explore creative methods to fund a significant open-space system that best meets the needs of residents and visitors and builds an interconnected network of scenic corridors that provides recreational and commuting opportunities as well as habitat connectivity.

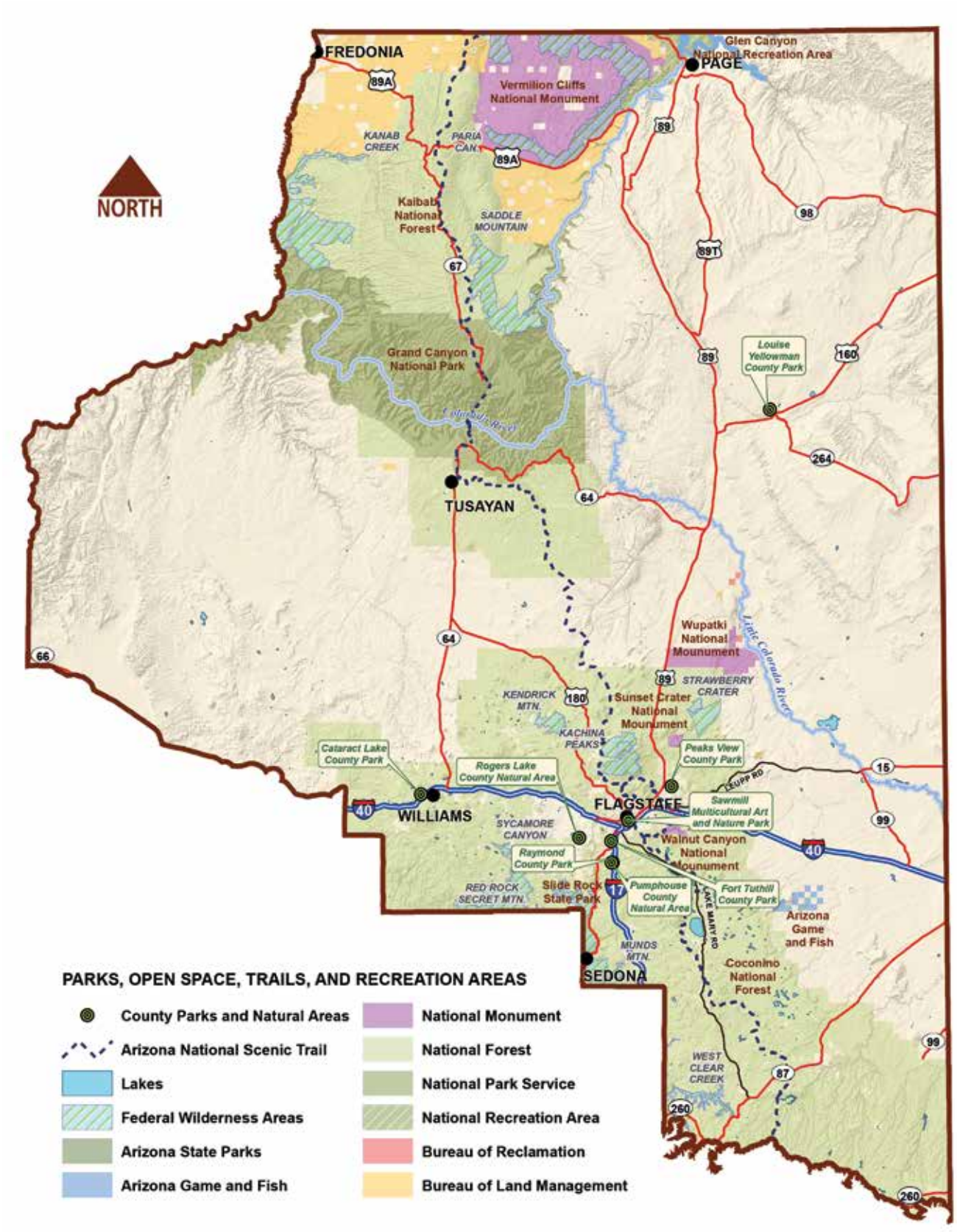
28. The County supports private land managers, management agencies, and citizen groups in their efforts to coordinate the planning and maintenance of recreational opportunities on public lands that minimizes adverse impacts to natural systems and residential areas.

29. The County values scenic views and viewshed corridors that are part of an integrated system of parks, open space, and recreation opportunities.

30. The County will support and help coordinate volunteer groups that work on conservation, parks, and open-space projects.

31. The County will work to balance the economic benefits of snow play with impacts on traffic and safety.

32. The County shall be a leader in establishing a Parks, Recreation, Trails, and Open Space Collaborative to plan, manage, assess, protect, and promote an integrated network in Coconino County.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.

Oral health staff at Pinecone Preschool.
COCONINO COUNTY PUBLIC HEALTH SERVICES DISTRICT

Community Services

INTRODUCTION

Many entities provide community facilities and services in Coconino County, including county, state, and federal agencies, special districts, and the private sector. Maintaining a high degree of coordination between these entities helps ensure that adequate facilities are provided and that improvements keep pace with ***development***. By proactively siting facilities and infrastructure, the County can help direct the future growth and development. Developing new infrastructure can have a negative effect on the environment if the County does not consider and mitigate potential impacts during planning. Major utility corridors containing high-voltage power lines and other infrastructure may cause ***habitat fragmentation*** and disrupt wildlife movement. Proactive planning can minimize such impacts.

This chapter establishes policies that provide guidance on community services related to locating utilities and telecommunications infrastructure in a way that respects the community character, scenic resources, and ecological integrity. These policies also encourage environmentally compatible solid waste management and ***wastewater*** treatment methods, including reuse and recharge. They also cover the County's role in promoting infrastructure for quality public health, as well as effective, accessible, educational opportunities. This chapter encourages adequate public facilities to support desirable land use and development patterns while conserving natural resources. Its goals and policies are designed to ensure that the County plans for services and facilities either during the land development process or through appropriate government programs.

Telecommunications at Lake Mary.

UTILITY SERVICES & CORRIDORS

Local utility services are critical to development. Public utility companies provide water, electricity, telephone, natural gas, cable television, and telecommunication services under the regulatory authority of the ***Arizona Corporation Commission (ACC)***. In some cases, utilities are also provided by special ***improvement districts***. Unlike some municipalities, Coconino County generally does not provide utilities. However, the County considers the availability of utilities when reviewing ***subdivision*** proposals and locations for local utility generating plants, substations, reservoirs, and similar installations through the ***conditional use permit*** process. It must also consider the effects of infrastructure and natural resource use on the environment.

Utilities are a consideration in determining appropriate development patterns. For example, in areas that lack public utilities, very low-density development is often considered most appropriate. Conversely, where utilities exist and installing infrastructure is efficient and cost effective, high-density development is generally more feasible. One way to reduce utility and infrastructure costs is to implement ***integrated conservation design*** planning methods in new developments. Another is to reduce the need for utility infrastructure through long-term solutions such as energy conservation, alternative energy sources, public transportation, ***water conservation***, and ***waste stream*** management.

Utility providers are included in the earliest stages of the subdivision review process. The County works with them to determine whether utilities are available, whether infrastructure upgrades are needed, and whether additional easements or other improvements are necessary. The *Coconino County Subdivision Ordinance* requires that developers provide a certain level of utility infrastructure, depending on the subdivision classification, which varies according to average lot size. Subdivisions with the smallest average lot size (and therefore the highest density) require the highest level of utility improvements. As average lot size increases (and density decreases), fewer utility improvements are required. On the other hand, lands developed through ***lot splits*** often lack planned utility and roadway infrastructure. In those situations, individual landowners or builders work directly with utility providers for line extensions. In remote areas, line extensions, transformers, and other equipment are often cost prohibitive for individual property owners. This has prompted many in the remote areas of the county to consider living off the grid, especially as improved technology and government incentives have made renewable energy more feasible, allowing for on-site electrical generation.

Major utility corridors such as those carrying high-voltage power lines, natural gas or coal slurry pipelines, and underground fiber-optic cables present challenges on a ***landscape*** scale. These corridors cross tribal, federal, state, and private land-management jurisdictions. Although the County typically has no regulatory authority in the siting and construction of these lines, it participates in the public review process, and it has historically requested that they follow existing infrastructure routes. These corridors play an important role in development. Permanent structural improvements are usually impossible in utility corridors and easements, and they may limit development. In addition, because of their size and linear orientation, these corridors can cause habitat fragmentation, disrupt wildlife movement patterns, and change hydrologic patterns as well as impact viewsheds. However, through creative planning and management approaches, corridors can be designed to minimize impacts. They may even be incorporated into developments as amenity features for ***trails***, ***open spaces***, or ***greenways***.

GOAL

Promote the installation of utilities in a manner that is compatible with community character, scenic resources, and ecological conditions.

POLICIES

1. Approval of development projects shall be considered only if public utilities or alternative technologies necessary to serve the use are available or can be provided by the developer.

2. Utilities infrastructure shall be located in a manner that is sensitive to community character and environmental and scenic resources.

3. The County encourages placing utility distribution lines underground whenever possible and, when above ground, efforts should be made to minimize environmental, visual, and aesthetic impacts.

4. The County encourages utility providers to locate new transmission lines, pipelines, and other transcounty utilities in existing infrastructure corridors whenever possible.

5. The County encourages cooperation between developers and the owners of utility corridors to use such corridors for trails, open space, and greenway features.

6. The County's Public Information Office will work with utility providers on methods to notify residents and landowners when utility work is being proposed.

TELECOMMUNICATIONS INFRASTRUCTURE

Efficient telecommunications infrastructure is necessary for public safety, convenience, economic development, and educational outreach through distance learning. Wireless communication may be the most feasible option for expanding phone and Internet service to many areas of the county. Increasingly, access to and capacity of broadband connectivity are necessary to basic economic and social activity. This is particularly true in rural areas of the county. However, towers and related structures, often considered unsightly, can impact the aesthetic qualities of surrounding landscapes. It is important to balance our need for the best available telecommunications services with the need to protect our valuable scenic resources and maintain neighborhood character.

Local governments must accommodate telecommunications infrastructure by federal law but they also recognize the benefit to residents. However, local jurisdictions may regulate the siting of such facilities. Identifying appropriate sites requires collaboration between the County, providers, land management agencies, and the public. It involves identifying technical requirements and exploring ways to limit the number of structures to the minimum necessary for service as well as ways to mitigate the visual impact of these structures and minimize impacts to wildlife ***habitat***.

The *Coconino County Zoning Ordinance* outlines the process, performance standards, and guidelines for siting and constructing wireless telecommunications facilities. These facilities, with a few exceptions, require a conditional use permit. The ordinance specifies zoning classifications and indicates where such facilities are permitted. It also includes a prioritized list of preferred types of locations, as well as a list of sites that have higher conservation values. Performance standards and design requirements stipulate maximum height, setbacks, color, and materials.

Oak Creek Telecommunications Facility.

GOAL

Promote telecommunications service development while preserving the visual character of communities and landscapes.

POLICIES

7. The County shall facilitate efforts to expand access and capacity of broadband and wireless telecommunications systems.

8. Telecommunication facilities shall be sited in a manner that is in harmony with neighborhood character, scenic resources, wildlife and their habitat, and the surrounding environment.

9. The County promotes the conservation of viewsheds through the efficient and effective development of telecommunication infrastructure.

SOLID WASTE

Managing solid waste is an important consideration in community planning. In Coconino County, solid waste is managed by recycling it or taking it to a landfill—primarily, to the City of Flagstaff's Cinder Lakes Landfill in Doney Park. One major private hauler has also constructed a transfer facility and hauls waste to a landfill in Joseph City in Navajo County. The City of Flagstaff offers curbside recycling services and transports recyclables to a materials recovery facility on Butler Avenue. Recycling services have been greatly expanded over the last several years and are now available in many communities in the unincorporated areas of the county such as Kachina Village, Mountainaire, and Doney Park. In many areas, recycling is available through private haulers that charge an extra fee for this service. Individuals can also haul their recyclables to the Flagstaff facility or to a transfer station. In more remote areas such as Fredonia, recycling is currently unavailable, although efforts are underway to provide this service.

Injury prevention car seat recycling. COCONINO COUNTY PUBLIC HEALTH SERVICES DISTRICT

The *Coconino County Subdivision Ordinance* requires subdividers to indicate in their development proposal the distance between the new development and an approved sanitary landfill or solid-waste transfer station. If this distance exceeds 10 miles, the subdivider must form a sanitation district to construct, operate, and maintain a new facility. This requirement may be waived if the subdivision is served by adequate private collection.

GOAL

Reduce solid waste, minimize the impact of its disposal, and support and encourage recycling.

POLICIES

10. In coordination with waste hauling services, residents, and businesses, the County supports efforts to reduce the quantity of solid waste and to maximize the recovery of recyclable materials.

11. The County will work to educate residents about the benefits of waste reduction and recycling.

12. Proposed methods of solid waste disposal and recycling must be considered in the planning for major developments and subdivisions.

Kachina Village wastewater treatment facility. FILE PHOTO

WASTEWATER

The goal of wastewater regulation is to protect ***groundwater***, the environment, and public health. The ***Arizona Department of Environmental Quality (ADEQ)*** delegates the regulation of community wastewater systems up to 240,000 gallons per day to the Coconino County Community Development Environmental Quality Division (CCCD-EQ). Additionally, CCCD-EQ regulates onsite wastewater systems as delegated by ADEQ.

Methods for handling wastewater depend on the nature of the site and the density of development. In most unincorporated county areas, individuals have on-site systems. In low-density areas with good soils and deep groundwater, these systems generally work well. However, some areas have poor soil conditions or high seasonal groundwater levels, which can make on-site systems difficult and expensive to develop.

A wastewater treatment system may be one of the biggest investments individual homeowners and developers make. The available space needed to accommodate a wastewater system can be significant. Knowing that your options could include a combination of systems—cluster, centralized, and on site—will allow for better incorporation into greenbelt areas. Federal and state aquifer protection rules allow "cluster systems" to serve several adjacent properties. In addition, cluster systems can provide benefits in areas where individual on-site systems are difficult or impractical.

A few unincorporated communities are served by centralized wastewater treatment systems, most of which are privately owned and operated. Centralized systems are beneficial for many reasons, especially for high-density development where lot sizes are too small to accommodate individual on-site systems. Reusing this treated wastewater, or ***reclaimed water***, benefits water conservation and ***aquifer*** recharge.

Reclaimed water can serve several conservation goals. It can be used to create community amenities or open space features. It can also be used to irrigate golf courses, playing

fields, and landscaping; to create or enhance ***wetlands*** habitat; to augment or maintain water flow in streams; and to recharge groundwater. For example, the Kachina Village wetlands benefits wildlife ***species*** and presents an opportunity to create amenities such as walking trails. It also provides educational and research opportunities and facilitates a cooperative partnership between the Kachina Village Improvement District (KVID), ***Northern Arizona University (NAU)***, AGFD, Ducks Unlimited, and the Northern Arizona Audubon Society, among others.

GOAL

Implement best practices associated with wastewater technologies or management.

POLICIES

13. Development projects should consult with CCCD-EQ to determine the most appropriate type of wastewater treatment system for the development.

14. The County encourages the use of environmentally sensitive, on-site, wastewater treatment systems or centralized community wastewater systems.

15. Development projects that include centralized community wastewater systems are encouraged to incorporate treated effluent disposal areas into greenbelts as part of an integrated conservation design or to reuse treated wastewater for environmentally beneficial uses.

PUBLIC HEALTH

Coconino County provides a broad range of health services to the public, focusing on lower socio-economic groups and at-risk populations. Research demonstrates that an individual's income, occupation, educational level, and place of residence are major determinants of his or her health. Individuals and families of low social and economic status tend to have less access to the health care and, as a result, have worse health outcomes. Toward this end, the Coconino County Public Health Service District (PHSD) was created in 2009 and offers health services to enhance every resident's ability to achieve their fullest health potential. PHSD works to prevent disease and promote wellness by educating the public, connecting people to health-related resources, developing health policy, enforcing public health code, and providing safety-net services.

The services that the PHSD offers vary and evolve as new threats to population health are monitored, identified, and addressed. The PHSD is currently divided into four units: Child, Family, and Community Health; Public Health Surveillance, Response, and Vital Records; Population Health and Primary Care Services; and Public Health Policy and Planning. These four units provide the totality of services offered, which may vary over time but currently include:

- Animal management
- Breastfeeding promotion
- Communicable disease monitoring and prevention
- Child fatality review
- Emergency preparedness
- Environmental health
- Guardianship investigations

- HIV case management
- Home visitation for child abuse prevention
- Injury prevention
- Immunizations
- Juvenile health services
- Involuntary commitments (behavioral health)
- Medical examiner
- Nutrition education
- Oral health
- Reproductive health
- Supplemental food assistance
- Tobacco use cessation
- Vital
- Women, Infants, and Children (WIC) services

Dr. Peoples and Bountiful Basket Program. COCONINO COUNTY PUBLIC HEALTH SERVICES DISTRICT

The PHSD has also been involved in developing a *Coconino Health Improvement Plan (CHIP)* that evaluates the public health consequences of an underdeveloped relationship with land use proposals and suggests actions that could be taken to minimize adverse health impacts and optimize beneficial ones. This idea is relatively new to the County; however, recent and continued training is expected to greatly increase the use of such plans in the near future. Such reports focus on:

- Access to affordable healthcare, healthy food, community services, and recreational opportunities
- Enhanced quality of life for underserved and vulnerable populations
- Decreased risk for chronic diseases, such as obesity and asthma

The County encourages other agencies and the private sector to coordinate with the PHSD to ensure that services are appropriately integrated into the communities where they are needed most. As such, the PHSD coordinates with a variety of other local, state, and federal agencies to provide health services. Many other informal agreements and partnerships exist, and the PHSD plays a role in coordinating these groups to ensure that resources are not duplicated in the public health system.

In addition, two hospital districts in Coconino County help improve access to healthcare for people living in rural areas: the Williams Hospital District, which covers a large area around Williams, and the Page Hospital District, which provides services to the Page area including Marble Canyon (*see the Coconino County Health and Medical Clinics map at the end of this chapter*).

GOAL

Prioritize the health and wellness of residents and visitors.

Community Services Building in Forest Lakes.

POLICIES

16. The County will monitor indicators of population health and report significant trends or events.

17. The County will improve maternal and child health outcomes, including early childhood development.

18. The County will proactively address the leading health issues of residents such as chronic disease, vector borne illness, reproductive health, food borne illness, and injury prevention.

19. The County will prepare for and react to public health emergencies in conjunction with public safety organizations.

20. The County will encourage the planning and establishment of safe and accessible public spaces for residents to be active, socialize, and establish community ties. Walkability and bikeability are valued.

21. The County will evaluate the public health impact of projects involving development, transit, public services, tourism, public parks, and any other subjects relevant to the health of county residents. Projects having an adverse health impact will integrate steps to mitigate negative impacts.

EDUCATION

Coconino County offers a wide array of educational opportunities. ***Coconino Community College (CCC)*** has two campuses in Flagstaff and an instructional site in Page. CCC offers associate degrees within transfer-oriented programs as well as professional/technical certificates and degrees. Students can also take advantage of distance learning at other locations throughout Coconino County and attend in-person classes at the instructional site. NAU offers both undergraduate and graduate degree programs. NAU's main campus is located in Flagstaff. Other distance learning opportunities in Coconino County at CCC and NAU include classes delivered via instructional television or through the Internet.

Nine school districts within Coconino County provide services to almost 16,000 school-aged children, a reduction of about 20% since 2002. About 3,000 students attend 14 charter schools, an almost 100% increase since 2002. The majority of charter schools are in Flagstaff, with others in Leupp and Page. Home schooling has also been a popular alternative for about 800 students, although about 20% fewer students are homeschooled now than in 2002. Other schools located within county boundaries are operated by tribal governments and the ***Bureau of Indian Affairs (BIA)*** (*see the Coconino County School Districts map at the end of the chapter*).

A major issue in a county as large as Coconino is providing adequate transportation to schools. The County works with the BIA to maintain school bus routes on reservations. Additionally, the Chevelon Butte School District was established to support the transportation of students to other areas but does not offer classes itself. Residents should be aware that public transportation to schools may not be available in all areas. As technology improves, the use of distance learning opportunities can increase access to education in the rural areas of the county.

The Coconino County Career Center provides training, off tribal lands, for youth and adults who want to enter or re-enter the workforce and are eligible for programs. The Comprehensive One-Stop in Flagstaff offers job listings, computers, and phones for job seekers wishing to develop applications or resumes. Assistance for low-income customers includes basic education and vocational training through One-Stop partners.

The County Superintendent of Schools is elected to provide fiscal processing and educational programming support to schools. Mandated responsibilities include maintaining certification records; recording school district expenditures; providing assistance on the use of student data, curriculum alignment, and technology; and maintaining affidavits of home schooling; among other duties. Although not mandated, the County Superintendent also operates two accommodation schools for at-risk and detained students and serves as a fiscal/project administrator for several specialized education programs.

While the ***Northern Arizona Council of Governments (NACOG)*** is the primary facilitator of early childhood education through Head Start and other programs, the County recognizes the vital importance of early childhood development and education in determining future wellbeing.

GOAL

Advocate, coordinate, and collaborate to create and increase access to effective and affordable educational opportunities.

POLICIES

22. Considerations should be made so that all areas of the county have adequate access to education, especially large growth areas with high populations of school-aged children.

23. In areas where the County has jurisdiction, increase infrastructure and champion all facets of education from early childhood through continuing education.

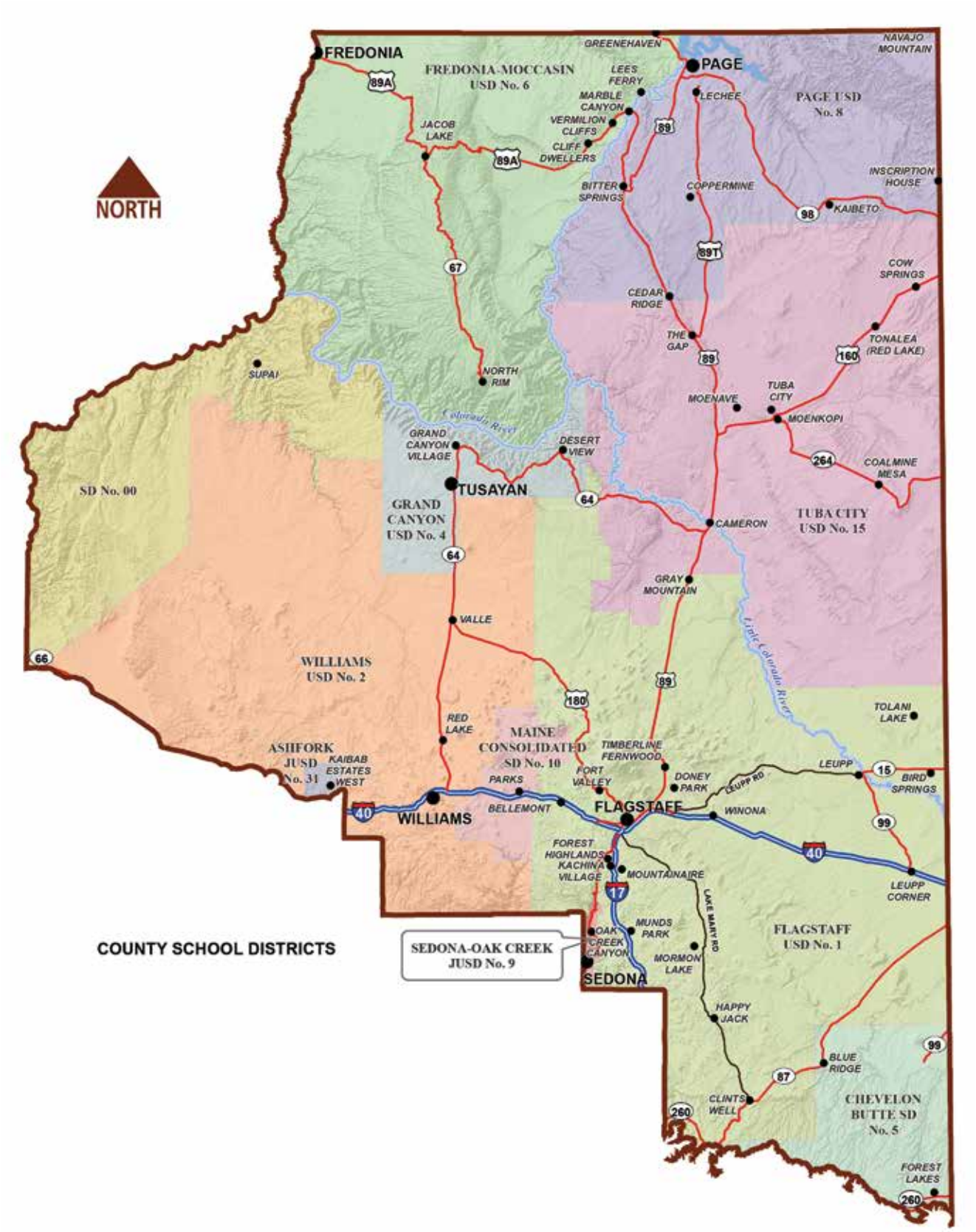
24. In areas where the County does not have jurisdiction, coordinate with educational providers to provide all levels of educational opportunities.

25. The County supports the sharing of infrastructure and infrastructure costs between different educational institutions.

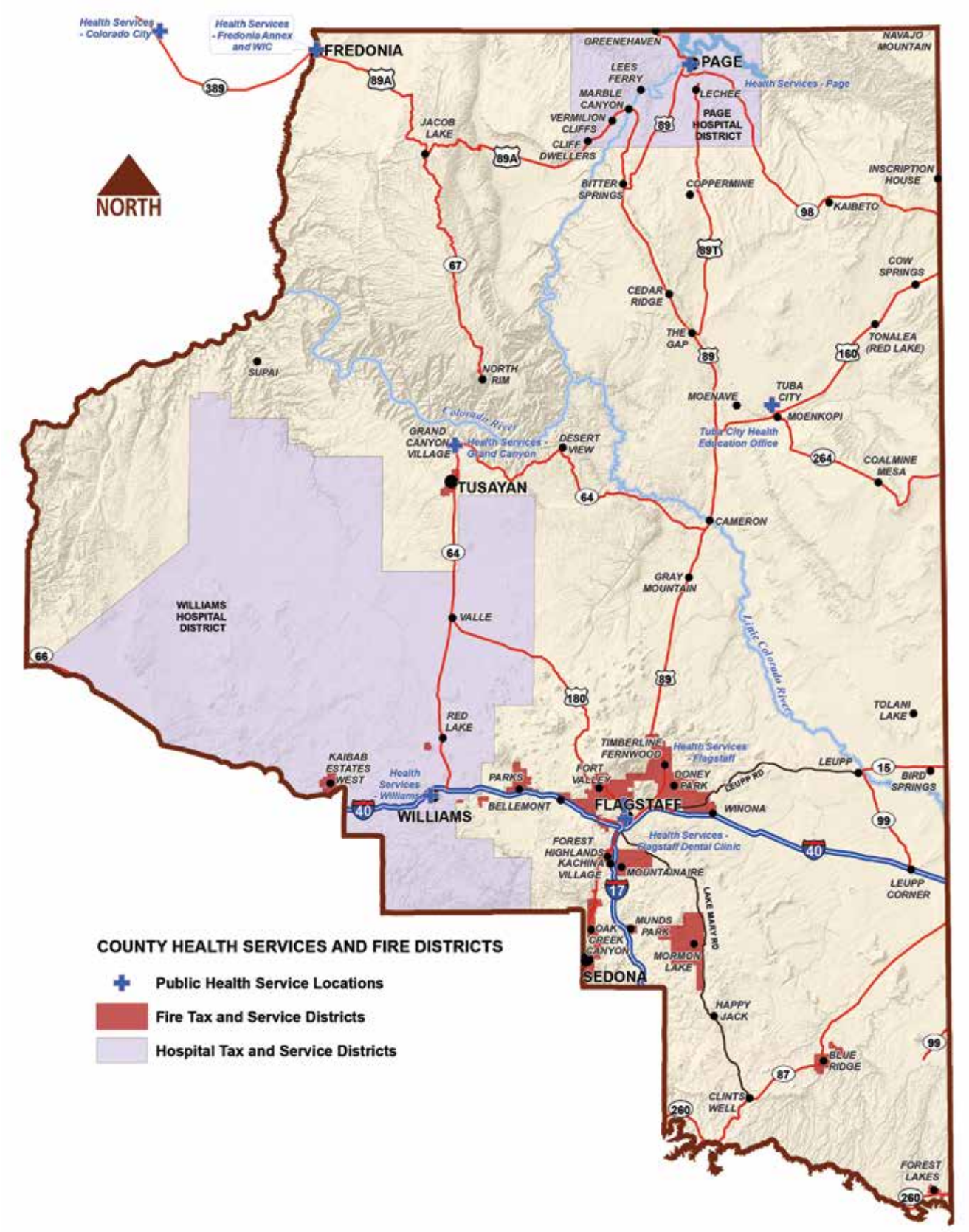
26. The County supports the development and implementation of distance-learning capacity into educational programs.

27. The County will assist K–12 education providers in the establishment of safe and efficient school bus routes.

Supervisor Liz Archuleta with Coconino County Public Health Services District Staff. COCONINO COUNTY PUBLIC HEALTH SERVICES DISTRICT



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.

Slide fire. COCONINO COUNTY EMERGENCY MANAGEMENT

Public Safety

INTRODUCTION

County residents envision their communities as safe places to live, work, and play. Public services are required to support a community's basic needs for fire protection, law enforcement, and emergency response and management. By adopting plans and ordinances and by allocating resources appropriately, the County can promote an effective level of services to satisfy these needs in a largely rural area. However, residents must be aware that the County does not offer the same level of service that one expects from a municipal government and, at times, offers no services at all. Services and infrastructure in rural and isolated areas may not be available, and when available, they may instead be provided by private companies, homeowner associations, or a special taxing district. Collaborative efforts with other agencies, organizations, and community groups are often necessary and contribute to the safety of residents and visitors.

This chapter addresses ways to minimize potential hazards associated with wildfires, floods, earthquakes, steep slopes, and the ***wildland/urban interface (W/UI)***. The goals and policies addressed in this chapter are designed to ensure that the County plan and prepare for adequate services and facilities, either during the land development process or through appropriate government programs. These goals and policies also relate to

public safety and services for fire protection, emergency management, disaster response, and law enforcement. They recognize the interrelatedness between environmental conditions (such as changes in climate) and land use and community activities while focusing on ensuring that communities and neighborhoods remain safe.

COCONINO COUNTY EMERGENCY MANAGEMENT

LOCAL EMERGENCY RESPONSE

Accidents, medical calls, or other incidents are typically handled by local emergency response agencies. Emergency medical services are generally available in unincorporated areas through ground ambulance and air units. In addition, most local fire districts, often the first responders to all types of incidents, provide some level of medical response. However, given the vast geographic extent of the county, emergency response times can vary widely. In the most remote areas, they can be delayed. Residents must accept a certain amount of responsibility for personal safety through emergency medical training in first aid, cardio-pulmonary resuscitation (CPR), and ***wilderness first responder*** methods. This training can save lives when professionals are sometimes hours away.

The effectiveness of a emergency response depends largely on how fast the caller can be located. Wireless 911 service, also known as Reverse 911, is now recognized as a necessity for public safety. This system gives responders the caller's approximate location from cellular phones. The Coconino County Sheriff's Office completed Phase II of the Reverse 911 system in 2014. In an emergency, the dispatcher can obtain a callback number, the cell tower location, and approximate location of the caller using a global positioning system (GPS) if the cell phone has a GPS receiver. The effectiveness of this system depends on well-marked streets for responders to verify locations with accuracy. A countywide effort that began in 2002 to standardize street names and addresses was completed in 2014, and the Navajo Nation is currently undertaking a similar effort. Additional emergency response issues have arisen because other jurisdictions maintain their own dispatch and emergency response services. Calls to 911 have gone to the wrong jurisdiction and delayed response times. Continued efforts to coordinate systems and responses are necessary.

Unfortunately, gaps remain in wireless cellular coverage in many of the remote areas of the county. The establishment of cellular facilities is regulated under the County's *Zoning Ordinance*. Through this ordinance, the County works with providers to locate future cellular locations to balance service to customers in more populated areas with the need to provide service for public safety in the more remote locations of the county.

The success of effective response also involves adequate physical ***access***. Ideally, residential and commercial developments must incorporate at least two points of ingress and egress for adequate emergency access with roadway widths that meet the needs of the emergency vehicles. Where this is not feasible, other mitigation measures may be appropriate. Proposed development projects must also consider the availability of local emergency services.

GOAL

Ensure emergency services and response to meet residents' needs.

POLICIES

1. The County places a high priority on the rapid and effective identification of properties by public safety personnel and emergency response agencies.

2. The availability of adequate emergency services and emergency access routes shall be considered in the review of major developments and subdivisions. Development projects shall provide for two means of vehicular access (ingress/egress) to ensure adequate entrance and exit routes for emergency response and management activities.

3. An emergency response mitigation plan shall be incorporated in development projects located in remote areas without nearby emergency medical services.

4. The County encourages emergency medical services and response agencies to locate facilities in communities so as to be accessible to and compatible with surrounding neighborhoods.

5. The County encourages enhanced wireless infrastructure that support public safety purposes.

6. Work with the Navajo Nation and other law enforcement jurisdictions to ensure rapid response to all emergency situations within Coconino County.

LAW ENFORCEMENT

Coconino County's large geographic extent and widely separated communities create challenges for law enforcement, particularly in remote areas. The Sheriff's Office is the lead law enforcement agency in such areas. Its services include community patrol, traffic enforcement, accident investigation, criminal investigation, civil process, County jail operation, and search and rescue. The sheriff uses ***community-based policing*** to encourage deputies to work actively with the community to identify and solve problems. One aspect of community-based policing is assigning deputies to outlying unincorporated areas. Volunteers supplement the staff of full-time officers, increasing the physical presence of the Sheriff's Office. However, because there will likely never be enough deputies to respond immediately to every situation in every corner of the county, residents of remote, outlying areas must accept a certain amount of responsibility for their safety and security. To ensure a reliable provision of services, it is necessary for the Sheriff's Office to work closely with other local, state, tribal, and federal law enforcement agencies throughout Coconino County. Effective cooperation and coordination is especially critical in maintaining safe, crime-free, rural and wildland areas, where tens of thousands of tourists, campers, and recreationists congregate throughout the year.

Certain community design approaches can prevent crime by addressing conditions that create public safety concerns. ***Crime Prevention Through Environmental Design (CPTED)*** involves designing or modifying the physical environment at the community, neighborhood, and private property level in a way that reduces opportunities for crime and the fear of crime. Not only can CPTED be cost-effective, but it can also foster a greater sense of community.

As the county's population increases, demands for law enforcement services increase. The most common issues are related to traffic, juveniles, domestic violence, unsafe firearm use, and improper ***off-highway vehicle (OHV)*** use. Crime-prevention programs can help relieve the pressure on law enforcement; they include community outreach and education, block-watch, and community-based youth programs. Providing adequate law enforcement services to meet the demands and expectations of an increasing population requires an ongoing assessment of needs and a corresponding commitment of resources.

GOAL

Ensure safe, crime-free neighborhoods and communities.

POLICIES

7. The County promotes multi-agency response to rural areas (outside a 30-mile radius of Flagstaff) coordinated through intergovernmental cooperative agreements.

8. The County places a high priority on providing high-quality, culturally sensitive, professional law-enforcement services.

9. Incorporating the concepts and principles of CPTED or similar concepts is encouraged for development projects.

10. In the design of development projects, developers are encouraged to consult with the County Sheriff's Office to identify and address potential public safety issues and to provide for adequate access for response and evacuation.

11. Residents and homeowner associations are encouraged to accept a certain amount of responsibility for their personal safety and security and to participate as active partners in neighborhood crime prevention programs in cooperation with the County Sheriff's Office.

12. The County encourages and supports the establishment of organized youth activities, including employment training and community service programs as a crime-prevention strategy.

COCONINO COUNTY EMERGENCY MANAGEMENT

FIRE PROTECTION

Although fire protection is available in cities within Coconino County, it is not universally available in unincorporated areas, especially in remote outlying areas. Property

owners in such areas may assume responsibility for fire protection on an individual basis if they are not located within a fire district; alternatively, they can join other property owners and petition the ***Board of Supervisors (BOS)*** to create a fire district. Such districts are funded by a secondary tax assessed on properties within their boundaries. Those who create a district essentially agree to tax themselves to provide fire protection.

To some extent, our ordinances and building codes also address fire protection. For example, the *Coconino County Zoning Ordinance* requires minimum building setbacks, separation between structures, and maximum lot coverage limitations, and it also includes requirements for landscaping that promotes the use of native plants and weed management. These strategies help prevent the spread of fire between structures and facilitate emergency access. The *Coconino County Subdivision Ordinance* requires varying levels of fire protection, depending on the type of ***subdivision*** and density of ***development***. Road design standards help ensure emergency access to properties. County building codes address minimum requirements for smoke detectors, ***emergency egress*** from structures, and fire separation between buildings or units with different occupancy types.

Various agencies in the county manage fire protection on their respective lands. Federal agencies with fire-management responsibilities include the ***U.S. Forest Service (USFS)***, the ***Bureau of Land management (BLM)***, and the ***National Park Service (NPS)***. The Arizona State Forestry Division has responsibility on State Trust lands. In addition, it often cooperates with federal agencies and local fire districts to respond to fires on private and public lands. The Arizona State Forestry Department provides technical assistance to private property owners who are developing and implementing plans for fire protection and fuels ***mitigation***. Many local fire districts also help property owners reduce fuels and implement other proactive fire-prevention strategies.

COCONINO COUNTY EMERGENCY MANAGEMENT

GOAL

Provide for a high level of fire protection and safety.

POLICIES

26. Development projects shall include adequate fire protection measures, as determined by the BOS with input from the local fire district and/or appropriate fire management agencies.

27. The County encourages and supports property owners in forming fire districts, annexing into existing districts, or otherwise organizing formal fire protection organizations pursuant to state law.

28. The approval of fire districts should consider the long-term viability of the district to provide high levels of service.

WILDLAND/URBAN INTERFACE

The W/UI is a concern in Coconino County because of the potential for wildland fires to ignite combustible structures and vice-versa. It includes areas where homes are built near or among lands that are prone to wildland fires. Depending on the area of the county, fire departments and districts might refer to wildland fires as brush fires, forest fires, or rangeland fires. In addition to homes, property, and trees, wildfires also destroy ***habitat***, soils, and forest health. They disrupt economic stability, transportation corridors, recreation opportunities, water supplies, and scenery, and undermine a community's emotional and spiritual wellbeing.

Schultz Fire. COCONINO COUNTY EMERGENCY MANAGEMENT

Control burn near Arboretum Meadow. COCONINO COUNTY EMERGENCY MANAGEMENT

In Coconino County, the threat of wildfire is serious because of our vast expanses of wildland and overgrown or dense forest conditions. Instead of open stands of large, widely spaced trees, forests are now overcrowded with unnaturally dense thickets of smaller trees. These stands are more susceptible to catastrophic "crown fires," which move rapidly from the ground into tree crowns and then spread from crown to crown. These high-intensity fires are more ecologically destructive than the low-intensity fires in healthy, natural forests. Fire officials recognize that the question is not whether catastrophic wildfires will occur, but when.

The Schultz Fire of 2010 burned more than 15,000 acres over 10 days and cost more than $8 million dollars to fight. The subsequent impacts of this fire are still being felt as residents and the County work to reduce flood hazards resulting from the loss of vegetation. A study by NAU estimates the total impact of the fire, subsequent flooding, and mitigation are ranging from $133 to $147 million. Seasonal monsoon events following the Schultz Fire caused significant damage to developed areas in the W/UI and beyond. The County has been responsible for mitigation efforts carried out in coordination with the USFS, the Natural Resource Conservation Service (NRCS), the ***Federal Emergency Management Agency (FEMA)*** and the ***Federal Highway Administration (FHWA)*** on mitigation projects totaling $30 million dollars. Therefore, reducing the threat of severe wildfires is a priority along the W/UI. Furthermore, the boundaries of interface areas should be increased to include areas beyond the "adjacent edge" of the forest boundary line. As proven by the Woody Fire of 2005 and the Hardy Fire of 2010, treated areas on the Coconino National Forest contributed to less intense fires, resulting in less damage to forest health and surrounding neighborhoods. Additionally, because so many variables affect fire behavior, no set distance from homes or communities would apply in all situations. Therefore, the potential threat of wildfire should be assessed when considering all development projects near any W/UI area. Since interface areas can span jurisdictions and authorities, interagency cooperation is essential.

The USFS, NPS, Arizona State Forestry Department, and local fire departments and districts have undertaken various projects and management actions to help restore natural

Sedona flooding. COCONINO COUNTY EMERGENCY MANAGEMENT

conditions and prevent catastrophic wildfires. In addition to forest treatments involving ***thinning*** and ***prescribed burning***, these agencies also typically address recreation and road management to reduce wildfire potential in the W/UI. However, agencies can only manage lands under their jurisdictions. To maximize the effectiveness of such actions, corresponding treatments are also necessary on adjacent private lands.

The County benefits from coordinated efforts to implement forest treatment projects. The Greater Flagstaff Forest Partnership is one of the longest-running forest partnerships in the nation. A local nonprofit, this organization has been effective in coordinating multi-agency efforts to promote and implement forest health treatments to reduce the threat of severe wildfires. Major efforts are underway to improve ecosystem health within our fire-dependent forests. Forest treatments on a regional basis will work to thin the forests of hazardous fuel loads and increase forest and watershed health. One such initiative, the Four Forests Initiative (4FRI) involves restoration projects on the Coconino, Kaibab, Tonto, and Apache-Sitgreaves National Forests. By restoring forest ***ecosystems*** that support natural fire regimes, the 4FRI project will promote thriving forest communities, resulting in strengthened economies while conserving natural resources and scenic values.

Another initiative that gained approval in 2012 is the Flagstaff Watershed Protection Project (FWPP). As a coordinated effort among Coconino County, the City of Flagstaff, State of Arizona, and the Coconino National Forest, prescribed forest treatments will help to reduce hazardous fuels in the mixed conifer forests in the watersheds surrounding Flagstaff. These treatments will reduce the risk of devastating wildfire and post-fire-flooding in the Rio de Flag and Lake Mary watersheds. Supported by a $10-million-dollar City bond, this project is a unique example of using municipal funds to carry out treatments within a national forest located within in city limits and unincorporated areas of the county.

To enhance these programs, the County requires that new developers formulate plans for forest stewardship and fuels mitigation and adopt safeguards for carrying these plans into the future. These safeguards include attaching requirements, conditions of approval, and recorded covenants to ***development projects*** to help ensure that properties are maintained in accord with the stewardship plans. Other possible actions include adopting advisory or mandatory codes designed to produce fire-resistant buildings and adopting

architectural and site development standards designed to produce more "defensible" and "survivable" structures in urban interface areas.

Creating ***defensible*** and ***survivable space*** helps protect structures from fire. Defensible space practices include increasing the moisture content of vegetation, decreasing the amount of flammable vegetation, shortening plant height, and arranging plants to provide adequate spacing. Such practices can significantly increase the likelihood of a home surviving a wildfire; however, the term "defensible" implies that someone will be there to defend it. In reality, if a major wildfire occurs, there will never be enough fire engines to defend every home in the community. The concept of survivable space goes one step further. It refers to property design practices that increase the likelihood of structures surviving a wildfire without active intervention by fire protection services.

The National Fire Protection Association, in conjunction with other agencies and organizations, developed the Firewise Communities Program to promote development practices that decrease the effects of catastrophic wildland fires. The Firewise approach considers the terrain, vegetation, building materials, and architectural design of a site. Its goal is to reduce continuous fuel sources and the chance of structural ignition.

GOAL

Reduce the threat of catastrophic wildfire in the W/UI.

POLICIES

29. Major developments and subdivisions in the W/UI, including more remote residential developments abutting national forest lands, must provide a forest stewardship / fuels mitigation plan and property maintenance covenants incorporating the principles of defensible and survivable space.

30. For development in the W/UI, the use of firewise landscaping and construction design and materials is encouraged to maintain defensible space. Technical assistance for fuels mitigation and fire prevention measures should be sought from the local fire district or the Arizona State Land Department (ASLD).

31. When considering development projects in or near the W/UI, the County encourages property owners and developers to consult with forest managers and land management agencies in developing fire mitigation plans that consider stand density, health, topography, and hydrology to ensure compatibility.

32. Promote the Firewise and Fire-Adapted Communities Programs and support the development of a countywide W/UI Code.

FLOODS, EARTHQUAKES, & SLOPES

In addition to wildfires, other ***natural hazards*** of concern in Coconino County include floods, earthquakes, and landslides. Because the ground is ***impermeable*** in many areas, floods can occur in response to excessive rainfall and snowmelt. The *Coconino County Zoning Ordinance* features a ***floodplain management overlay zone (FPM)*** that includes provisions for flood-hazard reduction but does not prohibit or prevent development in flood-prone areas. The overlay zone only requires that new construction does not encroach on the "floodway" (the main channel of discharge of a ***100-year flood***). The floodplain management regulations help ensure that property owners can obtain insurance under the National Flood Insurance Program and the County can obtain disaster relief from Federal Emergency Management Agency (FEMA).

Top: Kachina Village flood.
JOHN ABER
Bottom: Tornado damage.
COCONINO COUNTY EMERGENCY MANAGEMENT

Coconino County is at moderate risk for earthquakes, according to the ***Arizona Earthquake Information Center (AEIC)*** at ***Northern Arizona University (NAU)***. Numerous geologic ***fault systems***—Cataract Creek, Mesa Butte, and Bright Angel—comprise the ***northern Arizona seismic belt*** (*see the Flood and Fire Risk map at the end of this chapter*). The Cataract Creek system underlies the Flagstaff region and includes the Lake Mary fault. Damaging earthquakes occurred in 1906, 1910, and 1912, and minor quakes occur almost every year. The chance of an earthquake of magnitude 6 or higher is estimated to be about 50 percent in the next 30 years. The worst-case scenario for the Flagstaff community would be an earthquake of magnitude 7 or higher on the Cataract Creek fault system[1]. Other areas of the county would experience less potential damage because they are less developed. For construction purposes, Coconino County is classified under the ***International Building Code (IBC)***[2] as being in Seismic Design Category C. The earthquake provisions of the code are intended to protect against major structural failures and loss of life. Although new construction codes produce buildings that can resist the effects of ground motion, older structures are at risk.

[1] Bausch and Brumbaugh, 1997
[2] International Conference of Building Officials, 1997

Constructing buildings on steep slopes is potentially hazardous for several reasons—fires can spread upslope easily, landslides and slumping can occur because of poor soil conditions, and steep, narrow driveways can limit accessibility, particularly for emergency response. Nevertheless, properties on ridgelines and steep slopes often cost a premium because they offer scenic views. Regulations providing development criteria for steep slopes are limited. Although the *Coconino County Subdivision Ordinance* requires lots to have a buildable area that does not exceed 25 percent slope, it does not prevent construction on the steeper portions of a lot.

GOAL

Avoid or mitigate the dangers posed by identifiable or predictable natural hazards.

POLICIES

33. Development proposed in geologically hazardous areas or on steep slopes should be done in a manner that poses little or no hazard to public health, safety, and property.

34. Development projects including critical facilities, high-density residential, and major commercial and industrial uses shall not be approved in areas that are subject to high levels of seismic risk. Only very low-risk land uses will be considered for approval in such areas.

35. Utility providers are encouraged to strengthen, relocate, or take other appropriate measures to safeguard pipelines, transmission lines, and other utility infrastructure in areas subject to elevated natural hazard risk.

DISASTER RESPONSE & MANAGEMENT

Large-scale emergencies and disasters require a coordinated, interagency response. Because major emergencies and disasters can quickly exceed our local capabilities, the County has developed the *Emergency Operation Plan* adopted by the BOS on June 9, 2011 and updated on July 12, 2013. This plan details procedures to follow in case of a major flood, fire, hazardous material spill, winter storm, gas pipeline failure, mass casualty, energy or water shortage, earthquake, or mass evacuation. If an incident occurs, the Department of Emergency Management helps notify the appropriate emergency response agencies, assists in evacuation activities, and later assists in disaster recovery and mitigation. This office can also provide valuable input for new developments in identifying hazards and possible mitigation strategies.

Interstate transportation corridors also create a potential for major public safety incidents. As an example, the Burlington Northern Santa Fe Railroad runs about 100 freight trains across the county every day, often carrying hazardous cargo. A derailment could result in a ***hazmat*** incident requiring a coordinated interagency response. When such an incident or other disaster occurs, the Department of Emergency Management helps facilitate response and recovery operations.

Through well-managed emergency operations, communities with disaster response and recovery plans in place can reduce uncertainties, often shape the recovery outcomes, and make the case for state and federal funding requests when disasters occur. The County's *2013 Emergency Operation Plan* is a post-disaster recovery plan that was developed as part of Emergency Support Function #14. The *Coconino County Multi-Jurisdictional Hazard Mitigation Plan* (2010) works in tandem with the *Emergency Operations Plan* by identifying hazards, their likelihood of occurrence, and mitigation strategies to reduce their impacts when they occur.

Post-disaster recovery planning is an opportunity to improve our quality of life and disaster resiliency. It has the potential to support developed areas following a disaster and set goals that go beyond restoration. Local consensus on recovery goals and priorities can be essential in expediting assistance from state, federal, and other nonlocal sources. A local recovery planning process can also provide opportunity for public input that may improve the quality and equality of recovery. Through planning, a community's stakeholders can determine their vision for the community after recovery, identify obstacles and opportunities they may encounter in reaching that future, and measure their progress in achieving recovery as they have defined it. The County's *Emergency Operation* and *Multi-Jurisdictional Hazard Mitigation Plans* are supported by post-disaster planning. Coordination with the County's Community Development Department enables a joint effort to support post-disaster redevelopment to meet the needs of the residents in the most effective manner.

Following a disaster, Community Development staff can provide support to address long-standing community goals set forth in this *Comprehensive Plan* and area plans. The overarching goal of the long-term recovery plan is to increase the opportunity for community betterment—ideally, to have a community emerge from a disaster more resilient and sustainable as the result of recovery programs. Depending on the community and the disaster impacts sustained, this goal could focus on physical resiliency, such as rebuilding housing, to implementing new building codes that minimize future disaster-related damages or relocating structures from hazardous areas. This goal also identifies other aspects of whole community recovery, such as seeking out sustainable industries as part of economic recovery initiatives or assisting community organizations to increase the resilience of vulnerable populations. This is where leveraging resources creatively, applying local knowledge of community issues, and developing an alternative to status-quo restoration plans can combine to create an ideal recovery project.

GOAL

Maintain a high level of emergency preparedness to effectively respond to disaster and recovery efforts.

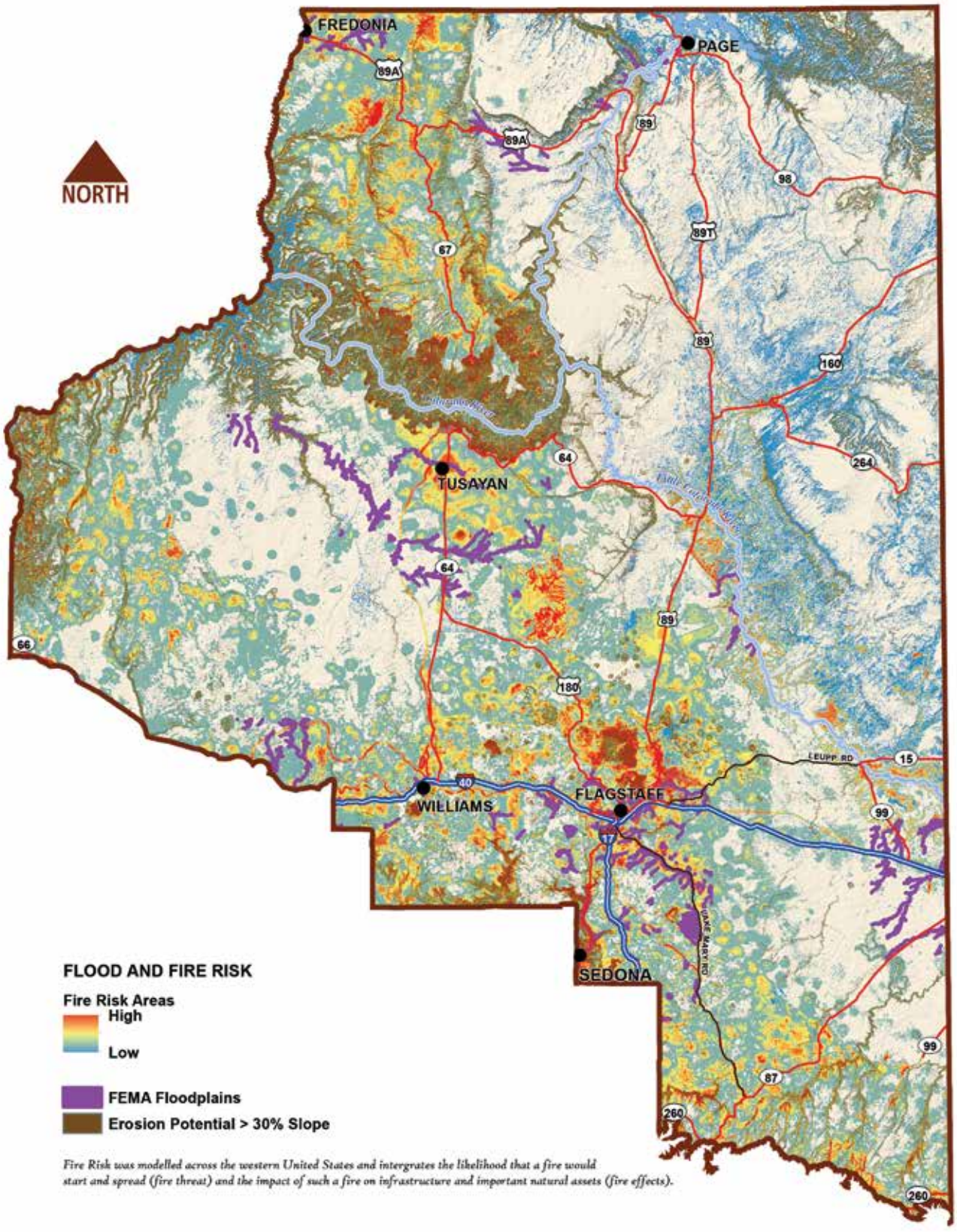
POLICIES

36. Commercial and industrial development projects shall identify all potentially hazardous or toxic materials expected to be utilized, stored, or produced by the development. Detailed plans shall be submitted regarding the use, storage, transportation, and disposal of such materials prior to considering approval of the project.

37. Development projects shall acknowledge existing conditions and/or hazards that may pose a threat to residents, such as proximity to physical hazards, and should mitigate such threats through appropriate site planning, buffering, and other physical design approaches.

38. The County shall engage in coordination with other agencies and jurisdictions to promote emergency preparedness and response to natural and human-caused disasters and post-disaster recovery efforts. To ensure preparedness, the County shall review the ***Emergency Operation Plan*** annually and update it as necessary.

39. The County will work to incorporate long-term, post-disaster recovery planning that includes community planning and redevelopment as part of the overall emergency efforts and initiatives.



Fire Risk was modelled across the western United States and intergrates the likelihood that a fire would start and spread (fire threat) and the impact of such a fire on infrastructure and important natural assets (fire effects).

Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.

Route 2 eastbound on RT 66 in downtown Flagstaff. JAKE BACON PHOTO PROVIDED BY NAIPTA

Circulation

INTRODUCTION

The vast geographic scale, topographic variation, and seasonal weather conditions in Coconino County make travel a challenge to visitors and local residents alike. These physical characteristics not only influence transportation planning, but they also impact our ability to construct and maintain an efficient, affordable ***circulation system***. The ***Northern Arizona Council of Governments (NACOG)*** and ***Flagstaff Metropolitan Planning Organization (FMPO)*** are charged with regional transportation planning responsibilities in Coconino County. The County's limited funding resources dictate a continuing emphasis on maintaining existing systems rather than pursuing new roadway construction and other improvements.

Within Coconino County, the airports, rail lines, highways, and ***trails*** move large volumes of materials and millions of people, including nearly 5 million visitors annually to Grand Canyon National Park. This infrastructure requires physical footprints. Without sound, conservation-based planning, it can fragment or damage ***habitat***, limit wildlife movement, introduce pollutants and non-native and invasive ***species***, cause adverse hydrologic impacts, disrupt scenic viewsheds, and create excessive noise. Minimizing impacts to the ***natural environment***, serving the needs of a diverse population, and connecting expansive rural areas require that the circulation system incorporate ***multimodalism***.

Switchbacks in Oak Creek Canyon.

This chapter provides guidelines for managing and improving the county's circulation system. Its goals and policies strive to balance the need for providing safe and efficient travel opportunities, meeting the access and mobility needs of residents, improving transit service in unincorporated areas, providing infrastructure for alternatives to motorized vehicle travel, and supporting the development of ***multimodal corridors*** while preserving the county's rural and scenic character.

ROADWAYS

Coconino County features many types of roadways: federal and state highways, a variety of County roads, ***U.S. Forest Service (USFS)*** roads, and private roads. Our primary, long-distance roadways include federal interstate highways, U.S. highways, and designated State Routes. Two major federal interstate highways serve crucial circulation roles for Coconino County; Interstate 17, which heads south to Phoenix, and Interstate 40, one of four east-west highways extending across the county from coast to coast. U.S. highways in Coconino County primarily serve north-south traffic (*see the Transportation Map at the end of this chapter*).

County-maintained roads range from local neighborhood roads to long-distance, intercounty roads. As of 2014, the Coconino County Public Works Department maintained and improved 962 miles of road within unincorporated areas. Of these, only 329 miles are asphalt; the remainder are gravel or cinder. In 2014, these roads included 22 miles of ***minor arterials***, 15 miles of ***major collector*** roadways, 194 miles of ***collector roadways***, and 746 miles of ***local roadways***. The Public Works Department uses a project ranking system to schedule capital improvements and maintenance for County roads and to plan neighborhood circulation patterns.

Other roadways and transportation infrastructure in the county are maintained by the ***Bureau of Indian Affairs (BIA)***, the ***Bureau of Land Management (BLM)***, the USFS, the ***National Park Service (NPS)***, the ***Arizona Department of Transportation (ADOT)***, and incorporated cities. Unincorporated county areas also contain hundreds of miles of ***private roadways*** in residential areas where properties have been developed through the ***lot split*** process. They also occur in platted ***subdivisions*** where paving waivers have been approved, in subdivisions that do not desire County maintenance, and in older subdivisions where roadways were never improved to County standards and thus never accepted for County maintenance. By statute, the County cannot improve or maintain private roads except when agreements are formed, such as in the case of ***road maintenance districts***. Additionally, the formation of a ***road association*** is possible. This less formal approach allows property owners to join in the formation of a collective, privately organized fund for road maintenance with no legal relationship to the County.

NACOG and FMPO distribute federal transportation planning and construction funds to local agencies in their respective areas. Coconino County has membership in these transportation organizations as well as the Northern Arizona Intergovernmental Public Transportation Authority (NAIPTA). Map 25 from the *Flagstaff Regional Plan* illustrates the major road network in the Flagstaff area. Policy decisions regarding circulation within the County's regional planning area around Flagstaff are influenced by both City and County provisions. In some areas, Coconino County enters into intergovernmental agreements with these agencies to maintain roadways. The County ***Board of Supervisors (BOS)*** and staff participate in the planning efforts of partner organizations.

Land use and circulation are inextricably linked. Population growth increases traffic volumes and vehicle trip lengths; in rural Coconino County, considerable distances often separate residential areas from commercial areas and employment centers. In addition, land uses that generate relatively high traffic volumes, such as convenience stores and restaurants, affect the flow of traffic on adjacent roadways. In areas with low-density residential development, virtually every trip requires the use of an automobile.

In 2014, Coconino County voters passed Proposition 403, a 3/10 of 1 percent (.003) sales tax because, despite cutting costs by $2 million annually, the County faced a large deficit for funding road maintenance projects. This road-maintenance sales tax will expire December 31, 2034. The funding deficit comes partly from improved vehicle efficiency and the lack of a gas tax increase since the 1990s. Because of the cost of road maintenance and deficits, the County continues to evaluate and limit the amount of road maintenance it will take on. This will have an impact on developments, which will require their own road maintenance plans.

Top: Navajo Bridge.
Middle: Round Tree Road.
Bottom: SR 89.

GOAL

Maintain a circulation network that is safe, efficient, and complementary to local communities and the environment.

POLICIES

1. The County will coordinate land use and circulation planning activities to encourage comprehensive and efficient development patterns that support adjacent land uses, complement the character of communities and adjacent neighborhoods, and minimize impacts to the natural environment.

2. The circulation system should facilitate the movement of goods, services, and people throughout Coconino County in support of existing and future economic activity and economic reinvestment.

3. The County shall fully implement Proposition 403 for improved roadway maintenance.

4. Encourage a collaborative working relationship with agencies and departments that have a hand in the planning, financing, construction, or maintenance of roadways within Coconino County to ensure that its standards, community values, and needs are considered.

Mountain Line bus in front of Monte Vista Hotel. JAKE BACON PHOTO PROVIDED BY NAIPTA

PUBLIC & PRIVATE TRANSIT SYSTEMS

Transit service is extremely limited within unincorporated Coconino County and outside the boundaries of the FMPO. In 2001, Coconino County began to provide fixed-route service ("Mountain Line") within the incorporated limits of the City of Flagstaff. It also initiated door-to-door ***para-transit*** service within the City of Flagstaff ("Mountain Lift") for persons unable to use the fixed-route bus system because of a disability. The *Flagstaff Five-Year Transit Plan*, adopted by the BOS in 2005, specifies improvements to transit service within the FMPO boundary.

In 2006, NAIPTA was formed as a partnership between Coconino County; Yavapai County; the Cities of Flagstaff, Sedona, and Cottonwood; and NAU to take both of these existing services (Mountain Lift and Mountain Line) and expand them in a more regional approach to circulation. Since NAIPTA's formation, many of the goals of the *Flagstaff Five-Year Transit Plan* have been implemented within city boundaries. Annual ridership there greatly increased—by 4.3%—from 2012 to 2014, which is considerably greater than the rate of population growth NAIPTA released the final report of their *2013 Flagstaff Regional Five-Year and Long Range Transit Plan*. This plan includes many recommendations for expanding transit services to the unincorporated areas of Coconino County; however, funding to implement those recommendations has not yet been identified or acquired. As the Mountain Line expands into the suburban and rural areas, the need for park-and-ride locations will emerge. Sharing parking lots with existing facilities can support a park-and-ride system.

Fixed-route, intercity service is available on the Navajo Nation between Tuba City and Window Rock, Tuba City and Kayenta, and Tuba City and Flagstaff [1]. Page is served by the Helping Hands Agency, Inc., which operates the Page Express within the City of Page along with regular service to LeChee and Greenehaven. The Hopi Senom Transit provides one route between Flagstaff and Kykotsmovi. Private intercity transit service is available from Flagstaff to destinations within and outside of the county. These private services include vans from Flagstaff to Phoenix, from Flagstaff to the Grand Canyon National Park, and seasonal service between the North Rim and South Rim of the Grand Canyon. The Greyhound bus terminal in Flagstaff provides intercity service to other locations within the state and around the country.

Amtrak passenger rail service is available in Flagstaff and Williams. Amtrak's Southwest Chief leaves each city twice daily—once westbound, en route to Los Angeles, and once eastbound, en route to Chicago. Service from Williams to Grand Canyon National Park is available on the historic Grand Canyon Railway. This train makes one round-trip to Grand Canyon National Park daily.

The sharing economy is playing a role in transportation across the county. Each year, innovative new methods of transportation are emerging through the use of technology. As of 2015, ride-sharing and vehicle rentals have emerged as new transportation

[1]Navajo Transit System http://www.navajotransit.com/routes.html

methods. These opportunities benefit residents by reducing costs and providing potential earnings. Because of our tourist-based economy and limited public transit over the greater county area, innovative transit resources can play a significant role in our transportation system.

GOAL

Improve rural and regional transit service opportunities.

POLICIES

5. The County supports opportunities to enhance and expand local, regional, and inter-jurisdictional transit services.

6. Consideration should be given to providing public transit access or sites for future transit infrastructure development in the review of major developments and subdivisions.

7. The County supports the implementation of the *2013 Flagstaff Regional Five-Year and Long Range Transit Plan*.

8. Densities that support transit should be favored near incorporated areas and activity centers.

Valle Air Park.
ZACH SCHWARTZ

AIRPORTS & AIRSPACE

The primary airport system in Coconino County includes commercial airports in Flagstaff, Grand Canyon National Park, and Page. It also includes general aviation, public-use airports in Tuba City, Williams, and Valle (*see the Transportation Map at the end of this chapter*). *A few smaller airports fall under the secondary classification system of the* ***Federal Aviation Administration (FAA)***: Marble Canyon, Cliff Dwellers, and Leupp/Painted Desert. Pulliam Airport, located 5 miles south of Flagstaff, is the fourth-busiest airport in Arizona and its commercial air service connects the county to Phoenix Sky Harbor Airport. Air cargo service at Pulliam also serves an important role in delivering freight and goods that would otherwise travel by truck or rail. Coconino County has no jurisdictional authority over the administration and planning of airport facilities.

Scenic flights over areas such as the Grand Canyon and Oak Creek Canyon are popular with tourists and generate revenue for tour operators. Most scenic flights over the Grand Canyon National Park originate from Grand Canyon National Park Airport, Page Municipal Airport, or McCarran International Airport in Las Vegas. The NPS and park visitors have expressed concerns about noise generated by flights over national parks, monuments, and ***wilderness areas***. Congress adopted the *National Parks Overflights Act* in 1987 to provide for "substantial restoration of the natural quiet and experience of the park and protection of public health and safety from adverse effects associated with aircraft overflights." The FAA implemented regulations on overflights in 1988 and strengthened those rules in 1994. These regulations limit hours of operation, specify permissible flight corridors and minimum altitude requirements, and implement no-fly zones. This issue continues to be the subject of debate among stakeholders.

GOAL

Explore opportunities for increasing air service for residents, tourism and freight while minimizing the impacts on surrounding communities and the natural environment.

POLICIES

9. The County supports improved air service at existing commercial airports as a means of moving passengers and goods within the county, state, and across the country.

10. To preserve the quality of visitor experiences, the County supports efforts to enforce existing flight restrictions and no-fly zones over national parks.

11. As renovations or expansions are proposed for airport facilities (including private airstrips and heliports), the following issues should be considered: compatibility with local land use patterns, minimization of adverse impacts from air-craft noise, potential for other environmental impacts, and impacts on scenic areas such as national monuments.

NONMOTORIZED CIRCULATION

The County features hundreds of pedestrian and bicycle trails. These trails are used almost exclusively for recreational purposes since opportunities for nonmotorized transportation in Coconino County are limited. Most opportunities for pedestrian travel and bicycle commuting are found within incorporated cities and towns, as well as within the FPMO boundaries. Although state and county highways feature no designated bicycle lanes, state law allows bicycle ***commuters*** to use widened shoulders unless otherwise posted. However, long distances between populated areas limit bicycling as a viable choice for commuting.

A priority for the County is to improve the connectivity for nonmotorized modes of travel. Especially important is creating connectivity between open space and natural areas as well as between areas within the FMPO (for example, connecting Kachina Village and Flagstaff for commuting purposes). Within the FMPO area, the ***Flagstaff Urban Trail System (FUTS)*** (see Map 26 of the *Flagstaff Regional Plan*) trails have been a huge success for recreation as well as commuting. Part of this success is due to the high quality of the trails, which feature a wide, well-graded surface and buffer from roadways. Because many Flagstaff workers reside in the unincorporated county communities of the FMPO, increased connection to these satellite communities could encourage ridership, relieve traffic pressures, and provide transportation options. These communities include Mountainaire, Kachina Village, Doney Park / Timberline / Fernwood, and Fort Valley, where

COCONINO COUNTY PARKS AND RECREATION

an improved trails system that is buffered from roads and highways would benefit bike and pedestrian commuters. Likewise, such improvements could connect trails between subdivisions in close proximity in more rural areas, as well as in developed areas with natural ones such as bike and pedestrian routes to trailheads and wildlife viewing areas.

In 2010 and 2011, the Kachina Village Multimodal Transportation Study and the Doney Park Multimodal Transportation Study were completed, respectively. Both were initiated jointly by ADOT and Coconino County through the Planning Assistance for Rural Areas (PARA) program provided by ADOT in an effort to improve bicycle, pedestrian, and public transit within the county. Although the studies recommended many improvements, the County has not yet identified a funding source to implement them.

GOAL

Improve nonmotorized circulation networks and provide greater opportunity for alternative modes of travel.

POLICIES

12. The County encourages development projects to provide infrastructure for nonmotorized travel. When appropriate for new developments, the County shall promote, and when feasible require, the installation of trails and bicycle lanes in coordination with ADOT.

13. The County promotes the connection of existing neighborhoods and communities (at both a local and regional scale) with trails, pathways, and other multimodal facilities. The County will coordinate with ADOT, the USFS, land managers, and property owners to achieve this.

14. Multimodal and no-motorized travel facilities should be designed to complement and enhance local community character, support accessible and low-cost recreation, and provide opportunities for interaction among residents.

15. Where pedestrian and bicycle routes exist on adjacent properties, major developments and subdivisions must maintain connections and continue the cohesive development of the nonmotorized circulation network.

16. The County shall set an example of incorporating pedestrian and bicycle travel infrastructure into the redevelopment or new construction of county collector and arterial roadways and support efforts to incorporate nonmotorized facilities into local roads and state highway redevelopment projects.

17. The County shall actively work to obtain funds to implement the recommendations of the Kachina Village and Doney Park Multimodal Transportation Studies, as well as obtaining more funds to conduct and implement similar studies in other areas of the county.

18. The County encourages the development of trails and infrastructure for nonmotorized forms of travel by local incorporated areas. The County encourages FUTS connections to greater Flagstaff area satellite communities and new developments within the unincorporated areas of Coconino County to support connectivity.

INFRASTRUCTURE DESIGN & DEVELOPMENT

Economic influences such as logging, ranching, tourism, and recreation have played a role in developing the county's circulation system. Historically, much of this system evolved to provide access to rangelands, public lands, and residential lands; it was not developed in anticipation of new growth areas. Today, the design of circulation infrastructure is based primarily on the *Coconino County Engineering Design & Construction Criteria Manual*, adopted by the BOS in 1991. The manual contains guidelines for designing roadways and accompanying pedestrian, equestrian, and bicycle facilities. Based on the County's functional classification system, these guidelines specify engineering and ***rights-of-way*** requirements for roadways built through the private development process as well as through capital improvement projects.

The *Coconino County Subdivision Ordinance* contains minimum development standards for circulation infrastructure in platted subdivisions. Requirements for roadway and nonmotorized transportation improvements depend on the minimum lot size of the properties in the subdivision and the functional classification of roadways. Paved roads are required for all new subdivisions, although developers can apply for a paving waiver if lot sizes are 2.5 acres or greater. Roadways with paving waivers will not be accepted into the County maintenance system; they are classified as private and must be maintained by a homeowner association using the same criteria as County-maintained roads.

Practically all circulation corridors in unincorporated areas of Coconino County provide infrastructure for a single transportation mode: travel by motorized vehicle. There is a lack of funding to design and acquire the necessary rights-of-way to accommodate nonmotorized travel. Efforts have been made within the FMPO boundaries to plan for a more balanced circulation system that includes multimodal corridors. Within more rural areas of the county, amenities such as bike lanes, pedestrian and equestrian facilities, and bus turnouts may not be incorporated into roadway designs in the near future due to a lack of funding. However, adding features such as wide shoulders into reconstruction projects would accommodate these amenities at little or no additional cost.

Increasingly, research finds that decreasing impervious surfaces has multiple benefits and that paving is often not a necessary measure for quality design. These benefits include a better ability for aquifers to recharge, less alteration of stormwater runoff, and less evaporation of water in general. Using ***low impact development (LID)*** concepts, the County can investigate to create a surface for vehicle travel that is feasible and works best for specific areas.

Easements and access are not always the same thing. Technically, an individual can satisfy legal access requirements by providing a legal description and dedication for an access easement where a road or driveway could never physically be built. For example, a person can create an access easement over terrain that is too steep for vehicles. The County's current *Subdivision Ordinance* could be amended to require proof of physical access in addition to the dedication of that access.

GOAL

Ensure the quality design and development of circulation systems that include both motorized and nonmotorized modes of transportation.

POLICIES

19. Before considering capacity improvements, the County encourages the preservation, improvement, and (where appropriate) redevelopment or restoration of existing circulation infrastructure.

20. Along highly traveled and congested travel corridors, the County promotes the development of multimodal and public transit opportunities as preferred alternatives to new roadway capacity improvements.

21. Circulation infrastructure in major developments and subdivisions should be designed based on the principles of integrated conservation design, with multimodal opportunities within and outside of the development.

22. In consideration of federal, state, and local environmental requirements, circulation infrastructure should be developed in a manner that promotes energy efficiency, protects air quality, and preserves historic, scenic, cultural, and environmental resources.

23. To protect unique or significant natural areas and conserve wildlife habitat and movement areas, the County encourages creative or best management practices in the design of circulation infrastructure improvement projects.

24. The County supports low impact design and decreases in impervious areas where dust, safety, and maintenance impacts can be minimized.

25. The County supports the creation of road access easements that are both legal and functional.

26. The County's Public Information Office will work with ADOT on methods to notify adjacent and affected residents and land owners during the design stage of all roadway projects so that citizens are better informed and have an opportunity to ask questions and express concerns.

27. The County will work collaboratively with ADOT to establish roadway, access management, and multimodal standards that are appropriate for Coconino County.

28. The County will work with the BIA, BLM, NPS, ADOT, FMPO, NAIPTA, and individual road districts to evaluate the impacts of proposed roadway projects undertaken within the county to ensure that appropriate mitigation measures are taken to limit dust, noise, and light pollution and prevent habitat destruction.

MINIMIZING ENVIRONMENTAL IMPACTS

The location and design of transportation infrastructure can alter natural patterns of hydrology and wildlife movement. For example, roads built on steep slopes and/or with

inadequate downslope drainage can cause significant erosion and watershed degradation. The disturbed soil that results from the construction of infrastructure such as roads can serve as a vector for invasive weeds. Because of this, best management practices should be applied in the design, construction, and management of transportation corridors. Similarly, roads that are closed should be rehabilitated to facilitate reversion to native vegetation.

Winter snow removal and maintenance has its particular environmental impacts. The mortality among roadside trees caused by salting roads is staggering and could cost the County and private citizens to safely remove them as they die and become traffic hazards. There is also an impact on the loss of screening and viewsheds. The County is already experiencing the loss of trees along roadways caused by the use of road salts. These trees will need to be proactively removed. Additional impacts cost citizens through increased vehicular maintenance.

Transportation corridors such as railroads and roads fragment habitat and can constitute significant barriers to wildlife movement. The risk to wildlife is due partially to the danger of being hit but also to associated fences (see the Wildlife section in the "Natural Environment" chapter for details). The County encourages landowners to work with the ***Arizona Game & Fish Department (AGFD)*** to establish wildlife-friendly fencing where necessary or required. When fencing is needed, the movements of small and large wildlife species can be accommodated in the construction and improvement of transportation corridors by following certain specifications, such as creating modest setbacks and providing crossing mechanisms at critical locations.

Artist's rendering of a proposed American pronghorn overpass to facilitate movement across State Highway 89 at milepost 441. See page 32 for additional information and credit.

GOAL

Use best practices in the design and management of transportation infrastructure to minimize the impacts to soil, hydrology, and wildlife.

POLICIES

29. Minimize the construction of new roads and encourage the construction of wildlife-friendly fences where necessary.

30. Avoid environmentally sensitive features such as stream channels and steep slopes in the design of new roads.

31. Plan and allow for sufficient drainage across roads and infiltration mechanisms to capture runoff.

32. Require weed mitigation in the design, construction, and maintenance of transportation corridors.

33. Work in conjunction with AGFD on improvements to accommodate wildlife movement across transportation corridors in order to minimize wildlife collisions and facilitate population connectivity.

34. The County strongly supports the use of low-level lighting, subdued illumination, and limited application in the use of outdoor lighting along roadways and encourages the conservation of the dark skies inherent in the natural outdoor setting.

35. To protect roadside trees, viewsheds, and safety as well as to manage long-term fiscal impacts, the County discourages the use of salt on roadways, unless salt technologies improve to reduce or mitigate these impacts.

MAINTENANCE & IMPROVEMENTS

Coconino County is responsible for maintaining and/or improving three types of roadways. The first type, "County roadways," include the roads it owns, along with roads that have been built to County engineering standards, located on County rights-of-way, and accepted by the BOS. The second type, "cooperative" roads, includes roads that are located on or across properties owned by others (including incorporated cities, ADOT, the USFS, and the Navajo Nation) and that are maintained by the County through intergovernmental agreements with those jurisdictions. The third type includes "primitive roadways" located on easements or rights-of-way that have not been accepted as official County roads but have been open since June 13, 1975; the maintenance of these roadways has been "grandfathered" into the system by the BOS.

Property owners are responsible for maintaining and improving private roads adjacent to or serving their land. Because these responsibilities are not enforced by the County, private road maintenance is generally haphazard or nonexistent and presents problems such as dust control, maintenance, and snowplowing, as well as access by emergency vehicles, mail carriers, school buses, pedestrians, bicycles, and equestrians. Liability associated with the lack of maintenance of private roads falls on the private property owners who could face legal consequences if someone pursues civil action. Private roads are generally local, with low ***average daily traffic (ADT)*** volumes; nevertheless, local residents use them every day.

Coconino County has insufficient financial resources to pave all existing unpaved roadways. Funds allocated to Coconino County for transportation improvement projects come from two sources: Highway User Revenue Funds (HURF) and Payments in Lieu of Taxes (PILT), also known as "Forest Fee" funds. ADOT allocates HURF money using a statutory formula based on the county's population and lane mileage. HURF funds include all revenues from motor-fuel taxes and other fees required to register motor

vehicles and operate them on public highways; they are the primary funding source for highway construction, improvements, and other expenses. The federal government distributes Forest Fee money to compensate for the loss of tax revenues because of the county's vast acreages of public land; this money can be used only for roads or schools. This funding source is derived from commercial activities on federal lands including oil and gas leasing, livestock grazing, and timber harvesting; funds are distributed to local governments for roads and/or schools. The County can also apply for federal transportation grants, such as TEA-21, to supplement funding. However, ***improvement districts*** provide a mechanism for property owners to pave, grade, maintain, or otherwise improve all or part of a street. Three different kinds of improvement districts are used in the county: County road improvement districts, road improvement and maintenance districts, and road enhancement improvement districts. Improvements must adhere to minimum County standards and Arizona fire code access-road standards. In addition, those owning property fronting the roadway must deed the necessary right-of-way to the County. In most cases, improvement districts provide the only way for residents to get County and private roads paved. Another option that residents can use to establish a road maintenance program is forming a type of improvement district known as a road maintenance district. To be eligible, residents must improve roads to a minimum, County-defined condition rather than to County road standards. Maintenance is performed by a private contractor under the administration of County staff. Residents pay for this maintenance annually as long as the district exists. As mentioned previously, property owners can also create a road association. The County has no role in these mechanisms, which function like an HOA.

GOAL

Improve circulation infrastructure while protecting the environment and community character.

POLICIES

36. To support local improvement initiatives, the County encourages the formation of improvement districts for previously developed areas.

37. The County will program roadway improvements to minimize air, water, and noise pollution and the disruption of natural surface water drainage in compliance with the provisions and requirements of applicable federal, state, and local environmental regulations.

38. The County promotes safety improvement and maintenance projects for circulation infrastructure (including snow and ice removal) that are consistent with conservation and ecosystem protection.

39. Road maintenance costs will be considered during review of projects that generate increased traffic or impacts to County-maintained roads.

40. The County will explore innovative public/private partnerships that enhance maintenance and infrastructure improvements.

ACCESS MANAGEMENT & SAFETY

Protecting the traveling public's safety is a primary objective that the Public Works Department achieves by programming projects for the ***Capital Improvement Plan (CIP)***, regularly maintaining roadways, and establishing design requirements for new improvements. Both the Sheriff's Office and the Public Works Department maintain vehicle accident data for County roads to help prioritize programming, adjust maintenance

schedules, or otherwise improve potentially unsafe situations. Bridge facilities are regularly inspected and maintained by ADOT to ensure safety.

Transportation system management (TSM) is a process that facilitates minor efficiency improvements to enhance the safety and operation of roadways without making major capital investments. One TSM technique, ***access management***, improves roadway capacity and increases safety by regulating vehicular access to public roadways from adjoining properties. The types of land uses that can thrive along transportation corridors depend on vehicle access. Adding access points to a corridor decreases through-trip mobility because vehicles must turn into traffic, creating possible conflicts. Access management techniques can mitigate these conflicts. Common ones include adding medians, frontage roads, common driveways, and parking lots, as well as controlling driveway spacing and improving the circulation patterns within developments adjacent to the roadway. Access management techniques should consider ADT volumes and functional classification of the roadway. Additionally, the County can regulate visual obstructions near access points.

GOAL

Provide for safe travel and access to property.

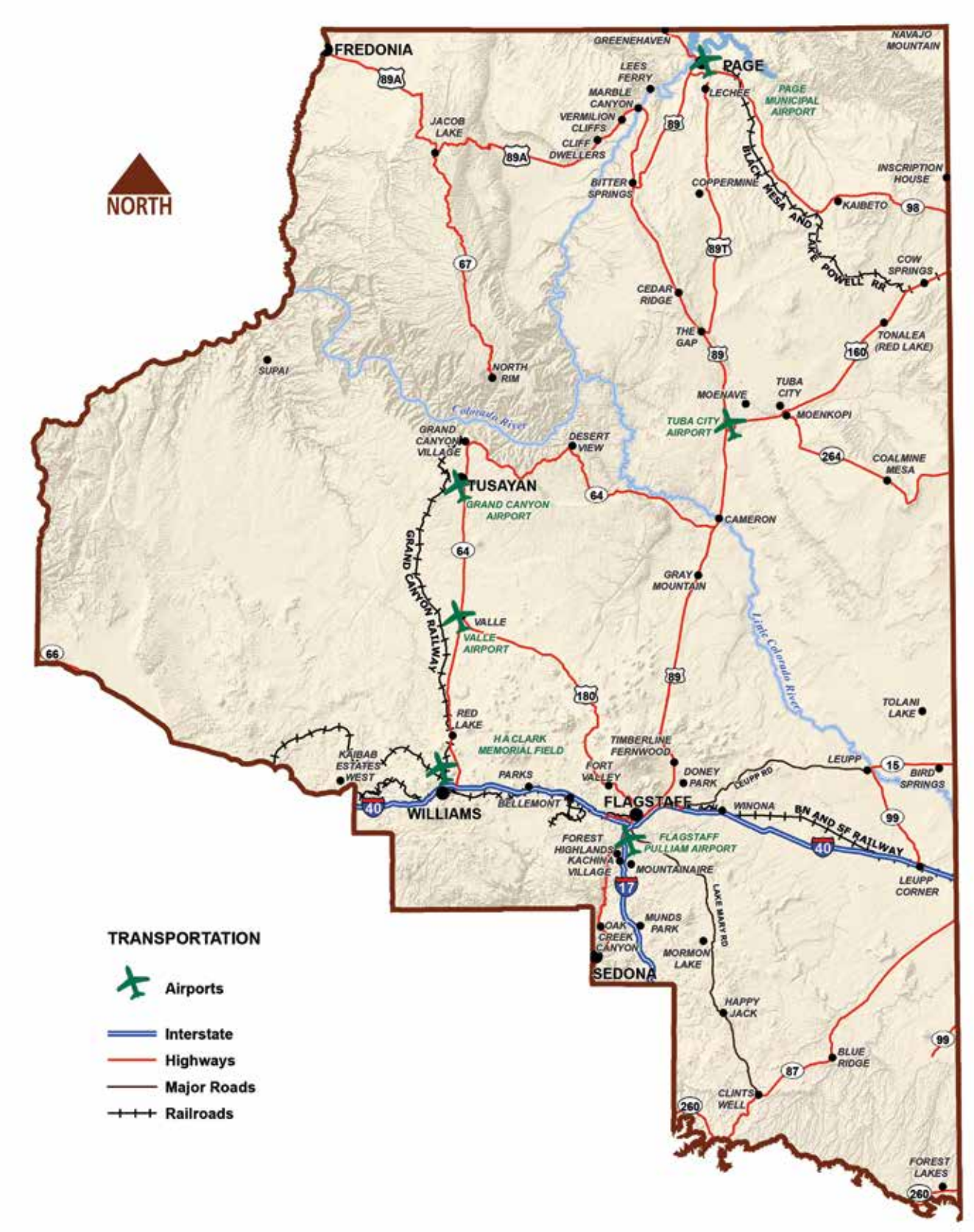
POLICIES

41. To ensure the safe and efficient flow of traffic, the County encourages the use of access management techniques to increase safety.

42. Where not addressed through the CIP, developers for major developments and subdivisions shall pay for necessary circulation improvements to support access to and within the site.

43. The developer must provide connectivity to adjacent existing and potential future infrastructure to provide adequate access for emergency service vehicles, circulation infrastructure in major developments, subdivisions, and other residential neighborhoods.

44. The County will work with developers to improve safety and circulation efficiency for nonmotorized or multimodal travel when roadway improvement or property development occurs.



Maps in this Comprehensive Plan are for reference and general planning purposes only. Coconino County does not provide any warranty of accuracy nor is any given or implied. Data sources are listed in the Appendix.

Barnard residence 2.6 KW photovoltaic system provides ninety percent of home's energy.
COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

Energy

INTRODUCTION

Reliable, ***clean energy*** is critical to the health, safety, and welfare of residents in Coconino County. It affects the stability of everyday life from the availability of potable water to the sustainability of land use and economic development decisions. The County has a responsibility to be a leader in innovative and responsible energy and natural resource management while supporting secure and clean energy technologies for its residents.

This chapter supports growth while balancing it with the protection of natural resources. It outlines the County's strong interest in increasing energy efficiency by:

- Articulating the goals of the Coconino County Sustainable Building Program that work to promote energy conservation and efficiency in new and existing buildings
- Providing support for the development of locally produced and used renewable energy projects

The policies in this chapter emphasize the value placed on the distinctive natural landscapes. They promote the conservation of natural resources, encourage sustainable development, and support the development of renewable energy sources. Additionally, the policies provide guidance for the expansion of renewable energy while avoiding, minimizing, and mitigating negative impacts. Energy goals and policies related to transportation can be found in the "Circulation" chapter.

In 2012, the County ***Board of Supervisors (BOS)*** approved an "Energy" element as an amendment to the *Comprehensive Plan*, which provided high levels of specificity for energy projects. This information is still applicable and is included as Appendix D to provide additional insight for expectations and support for decision-making.

Doney Park propane facility.
MELISSA SHAW

COCONINO COUNTY'S CURRENT ENERGY PICTURE

In the decade from 2000 to 2010, Coconino County's population grew by 16%[1] and it continues to grow at a rate of about 2% annually. That growth, along with an increase in per-capita consumption, is increasing demand on energy providers. As of 2009, traditional sources make up the majority (94%) of energy generation in Coconino County. Such sources include electric power generated through fossil fuels, along with natural gas, coal power, and nuclear power. Renewables account for the remaining (6%) and include hydropower, wood, solar, geothermal, and the combustion of waste materials.

Locally, interest in developing new renewable energy projects has increased. Permits for residential solar installations have become a regular occurrence and, as of 2015, two utility-scale wind and solar energy projects have been approved by the County through ***conditional use permits***.

In the coming decade, biomass may become a part of the county's renewable portfolio. In 2014, the Four Forest Restoration Initiative (4FRI), the largest forest restoration effort in our nation's history, was approved to reduce forest fuels as well as improve ***ecosystem*** health. 4FRI will produce a large supply of biomass materials with the potential to fuel large projects on a regional scale, especially for industry.

Historically, Coconino County has been the site of large-scale power plants that use non-renewable fuels to generate power for the Western Area Power Authority (WAPA) power grid. The driver for these large-scale energy-production projects has been the demand from larger metropolitan areas in the Southwest. Moreover, these power-generation projects involve complicated tradeoffs regarding the need for clean, renewable energy, and their local effects on viewsheds, neighbors, wildlife, vegetation, natural quiet, and the land.

The majority of electricity generated in Coconino County comes from coal, which is mined in open pits by Peabody Coal on the Navajo and Hopi Reservations and in New Mexico. The coal is burned to heat water from Lake Powell and the resulting steam creates energy, providing power. Navajo Generating Station (NGS), located outside of Page, produces 2,250 MW of energy and is one of the largest coal plants in the country. The plant supplies energy to Arizona, New Mexico, and California and provides the energy to pump water in the Central Arizona Project (CAP). The NGS is under an agreement with the ***U.S. Environmental Protection Agency (EPA)*** to reduce harmful emissions and mitigate its carbon footprint by closing one of three generators and ceasing operation of conventional coal-fired generation by December 22, 2044.

[1] U.S. Bureau of the Census. 2010. Profile of General Population and Housing Characteristics

Passive solar home with local stone. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM

ENERGY CONSERVATION & EFFICIENCY

Energy conservation is the idea of doing with less or doing without. Energy efficiency involves getting more out of less by employing technologies that perform while using fewer resources. These two concepts—energy conservation and energy efficiency—present viable opportunities for residents and businesses to reduce their overall consumption.

Reducing energy consumption is a high priority because it will reduce the demand on existing infrastructure, save money, and reduce the need for new infrastructure and its associated impacts. Reducing energy consumption has environmental, economic, and social benefits. Because most of the energy generated in Coconino County comes from fossil fuels, reducing energy consumption would also reduce nitrogen oxide, sulfur dioxide, mercury, and carbon dioxide emissions while significantly reducing water use. Economically, reducing energy use saves money and minimizes utility rate increases. Social benefits include gains to health and wellness related to clean air and water.

Increasing energy conservation through behavior change is the most affordable and therefore immediately achievable energy policy. Actions that are as simple as turning off the lights, driving less, riding a bike, and installing programmable thermostats are all energy-conservation strategies. While these changes may seem minor, when compounded with every household and business in the county, their results are significant. Individual stewardship and actions are the basis for impactful energy conservation.

To encourage energy efficiency in new construction, Coconino County adopted the 2012 International Energy Conservation Code (IECC), which will increase efficiency by 30% over the previously adopted 2006 codes through increased requirements in insulation, air tightness of exterior walls, and increased efficiencies with lighting and heating systems. Many of Coconino County's builders have embraced building to the ENERGY STAR standard. Likewise, individual owners and builders have participated in the County's Sustainable Building Program and use the sustainability checklist to earn the County's annual Sustainable Building Award. Using sustainable building materials and technologies can increase the value and marketability of a home or business while saving a considerable amount in energy costs over the life of the building. Substantial energy

savings can be achieved by retrofitting existing buildings based on energy audits. Both major overhauls and small changes can impact energy use. Energy-efficiency strategies and new technologies are critical to helping Coconino County residents maintain comfort and living standards while reducing energy use.

Low-cost building techniques such as passive solar, thermal mass, insulation, overhanging eaves, and use of vegetation can significantly reduce a building's energy consumption. ***Coconino Community College (CCC)*** and the Sustainable Building Program both provide a number of courses and training opportunities on energy-efficient construction methods.

GOAL

Reduce energy consumption by increasing energy conservation and efficiency.

POLICIES

1. Coconino County shall be a leader in reducing energy consumption and shall strive for buildings to be energy self-sufficient.

Top: Mobile training unit of Sustainable Green Building & Alternative Energy Technology Programs. COCONINO COUNTY SUSTAINABLE BUILDING PROGRAM
Bottom: FILE PHOTO

2. The County shall continue to pursue funding opportunities for weatherization programs, for educational programs for energy conservation and efficiency through the Sustainable Building Program, and for coordination with educational institutions and community partners. The County shall also support educational opportunities for workforce programs, job training, and employment opportunities such as the Energy Efficiency Conservation Corp.

3. Proposed subdivisions, commercial, industrial, multifamily residential, and public and semipublic uses may consult with the Sustainable Building Program as part of the planning and zoning process. The review will include consultation on site location, project layout for maximum solar gain, building design, energy efficiency, and conservation of resources.

4. The County shall support, foster, and adopt building efficiency programs and energy standards (including national programs such as ENERGY STAR and LEED) that reduce per-capita consumption.

5. The County shall be a model of sustainable design and energy efficiency in the construction of new County buildings and renovations.

6. The County encourages energy conservation in both new construction and remodel and retrofits through codes and support of incentive programs.

7. The County will assist residents of all income levels to identify achievable strategies that reduce energy consumption.

8. The County shall promote the conservation of water, which requires substantial energy to treat and distribute.

GENERATING ENERGY

While the reduction of energy consumption is the most effective goal for the County, support for additional energy resources will be necessary to meet projected future energy demands. Clean and renewable technologies are a rapidly growing segment of the energy sector and contribute to energy independence and security through diversification and local energy production. Fortunately, the use of alternative renewable energy sources within Coconino County has been expanding because of the effects of both state and federal energy policies and the availability of more than 300 days of sunshine and moderate wind resources.

Renewable energy technologies are evolving at a rapid pace. New strategies for reducing impacts to the natural environment, wildlife, viewsheds, and natural quiet are being developed. The renewable energy industry and its technologies are ever changing, and it is critical that the County ensures that best practices are being implemented. Two major systems of renewable energy generation are ***distributed energy systems*** and ***utility-scale energy systems***. The following types of energy generation are relevant to Coconino County.

Coal

"Clean coal" technologies are designed to reduce the impacts of coal-based energy generation by making the large-scale burning of coal more efficient, thus reducing pollution. Clean coal is one tool for minimizing impacts of this traditional energy source. However, the effectiveness of these "clean" technologies is still being researched. Two ways the County and residents can help mitigate the impacts of carbon emissions and coal-based plants are to offset carbon at a small scale by planting native vegetation and trees and to preserve healthy soils. Vegetation and healthy soils provide natural air filtration and create sinks or places for carbon to be stored outside the air, a process that is also known as carbon sequestration. This choice of mitigation should be carefully considered to manage invasive species and water usage.

Natural Gas

Natural gas is an expanding national energy sector that is applauded for having less environmental impact than other fossil fuels. However, hydraulic fracturing, or "fracking," has been correlated to groundwater contamination and increased seismic activity. Mineral extraction or mining operations on parcels of five or more contiguous commercial acres that include natural gas extraction, oil production, and coal production are currently exempt from County regulation.

Nuclear

Nuclear power is another traditional energy source. Some consider nuclear power to be a clean energy source because of its lack of emissions; however, it has other environmental impacts related to the mining and processing of uranium and the disposal of depleted nuclear fuel. Although there are no nuclear power plants in Coconino County, there are uranium mines and mining claims near Grand Canyon. In 2012, the federal government placed a 20-year moratorium on new uranium mining claims near Grand Canyon. However, this does not affect proven, existing claims or the continued development of the existing eleven uranium mines within the county. Counties have no jurisdiction over mining operations larger than 5 acres.

Distributed Energy Systems

Distributed energy is the generation of electricity in small amounts in many places. Examples of distributed energy systems include photovoltaic panels on rooftops, ground-mounted wind turbines, and ground-source heat pumps. Distributed energy systems can minimize the expense and negative impacts of transmission lines and land disturbance by making use of existing transmission lines and corridors. They offer an option that may reduce impacts to wildlife and other natural resources as well as disperses the impacts of energy generation across the community.

The County has taken measures to remove barriers to distributed systems such as allowing the installation of solar panels under current codes and requiring only a building permit. In addition, the *Accessory Wind Energy Ordinance* was approved by the BOS in 2008, allowing for distributed wind energy systems to be installed with a building permit.

Perrin Ranch Wind Farm tour.

Other distributed energy technologies include solar water heaters and ground-source heat-exchange pumps, or geo-exchange systems. There have been significant technological advances with both of these systems, making them more user friendly and cost effective. Since 2011, the County has seen an increase in the number of permits issued for various types of distributed energy systems, in part because of its code revisions and Sustainable Building Program.

In 2010, Arizona Public Service (APS) initiated the Community Power Project in the Doney Park area to study the impacts of having many distributed systems on the grid. The project has entailed installing photovoltaic systems on the rooftops of 160 single-family dwellings. Although the solar panels are located on individual residences, APS retains ownership and maintenance responsibilities. These homeowners have granted easements to APS in exchange for a fixed rate on their energy bills for 20 years. At Cromer Elementary School, the amount of power generated—871 kW from 1,560 solar panels—would exceed what could be used on site. In this case, a conditional use permit was required to mitigate potential impacts because the distributed energy system is beyond an accessory use of the site.

Distributed energy systems also include ***net-energy-generating*** buildings. These buildings generate more energy than they use by combining conservation and efficiency measures with on-site power production through renewable energy sources like solar photovoltaic, wind energy, and solar thermal (hot-water). Net-energy will be an important conservation strategy for future development.

Utility-Scale Energy

At least two dozen meteorological wind-test towers have been approved and constructed in various parts of the county since the early 2000s. The Perrin Wind Farm and the Cromer Elementary School portion of the APS Community Power Project are just two examples of utility-scale energy generation in Coconino County. The Perrin Wind Farm, which consists of 62 turbines, gained approval in 2011 and began operating of January 2012 (*see the Energy Infrastructure map at the end of this chapter*). Utility-scale solar was approved in 2011 at Cromer Elementary School and at an APS substation in Doney Park. These utility-scale projects tend to impacts surrounding communities and the natural environment significantly more than distributed energy systems. However, interest in utility-scale energy projects continues to be considerable. This is because they have the potential to sustain the economic viability of working ranches and create jobs and, compared to traditional energy production, they conserve water resources, minimize air pollution, and complement other sustainable goals and policies of the *Comprehensive Plan.*

Biomass fuel is another utility-scale source of energy given the abundance of forest products in the county. To create energy, the biomass process uses renewable materials, such as wood, plant material, and agricultural wastes through direct combustion or gasification to create gas. Forest treatments occurring over the next decade to reduce fire risk and improve the health of the ponderosa pine forests through the 4FRI project create a source of fuels for biomass operations. As of 2015, no utility-scale biomass processing plants exist in Coconino County.

Top: Perrin Ranch Wind Farm.
JOHN ABER
Bottom: Solar energy on SR 89.
JOHN ABER

Glen Canyon Dam, with a generating capacity of 1,300 MW of electricity, is the only hydroelectric power plant in Coconino County. While it produces no air emissions, there are considerable environmental impacts to the Colorado River corridor and ecosystems, both upstream and downstream. Micro-hydro plants in small river channels are a developing technology. However, Coconino County has few perennial streams and rivers, so the development of any new hydroelectric plants is unlikely.

Geothermal energy uses the high temperatures deep within the earth. The average temperature in the county at about 4 miles depth is 175 to 200 degrees Celsius, which is warm enough for utility-scale geothermal production. Development of this renewable energy source has been costly and challenging, however, because extraction is difficult given the depth of the heat and the amount of rock subsurface. Like other renewable energy systems,

geothermal technology is rapidly evolving and many experts believe that Coconino County has some of the highest potential in Arizona for a utility-scale geothermal plant because of volcanic vents.

The collection of gases created from decomposition occurring in landfills can be an energy source. Gases are pumped to an engine, which powers a generator connected to the electric grid. Benefits include reducing the amount of methane released into the atmosphere and turning a waste byproduct into a marketable asset. As of 2012, Cinder Lakes Landfill in Doney Park is the only feasible location for such a facility.

GOAL

Utilize wind and solar resources by encouraging distributed energy systems.

POLICIES

9. The County will review codes and ordinances on a regular basis to assure adaptability to changing technology and best practices in distributed energy systems.

10. The County encourages distributed energy systems located at the point of use and on disturbed lands near existing substations and transmission to reduce the amount of infrastructure and land disturbance required for energy generation.

11. The County will continue to explore, facilitate, and streamline the installation of distributed energy systems for homeowners and small businesses by providing education and resources through the Sustainable Building Program.

12. The County will encourage job training programs and other educational opportunities to create a workforce of experts in distributed energy systems.

13. The County will encourage the collaboration of agencies, residents, and businesses to pilot new distributed energy projects.

GOAL

Develop efficient and appropriate energy generation while avoiding and minimizing impacts to the natural environment, wildlife, human health, and community character.

POLICIES

14. The siting of utility-scale projects and transmission lines shall consider the protection of viewsheds; the potential for noise disturbances to adjacent residential areas; the conservation of species, habitats, and water resources; the preservation of prehistoric, historic, and cultural sites; the conservation of scenic corridors; and the protection of the character of public lands. Underground collection lines are strongly encouraged.

15. The County supports the development of utility-scale projects on previously disturbed lands and areas that are close to existing transmission interconnections.

16. Utility-scale energy projects that allow for he continuation of traditional land uses such as ranching and hunting shall be preferred over projects that assume all use of the land. The ability to retain multiple uses of the land such as combining solar rooftop installations with agreements to keep ranches intact is ideal.

17. Project sites that conflict with critical wildlife habitat, sensitive species, movement corridors, riparian areas, and areas of significant topographic relief such as canyons and cliffs should be avoided to prevent the need for extensive data collection and mitigation measures to reduce the risk of mortality, habitat fragmentation, and significant long-term displacement of wildlife.

18. The County encourages utility-scale renewable energy projects that engage in innovative research and operational procedures that are consistent with current best practices and scientific knowledge. These may include the use of radar activated lighting, wildlife study designs that include off-project comparison sites, turbine curtailment during migratory periods, and other practices designed to improve the understanding of project impacts and to reduce these impacts.

19. In order to protect water supplies, projects using water conservation methods or reclaimed water shall be preferred over more water-intensive systems that require additional impervious surfaces.

20. The County supports changes to federal regulations that would allow for visual warning systems that use radar to activate aviation safety lights or other new technologies to protect viewsheds and dark skies. The County encourages these radar-activated systems for all projects required to install safety lighting by the Federal Aviation Administration.

21. In order to balance the impacts to residents and the natural environment, the County prefers projects that can demonstrate significant energy benefits on a local and regional scale. The County will collaborate with appropriate federal and state agencies to balance the impacts of energy projects. Conditional use permit renewals will be required to demonstrate how they are specifically benefiting Coconino County.

22. The County will encourage legislative changes necessary to allow groups of citizens to create renewable energy special districts.

23. The County will require mitigation measures concerning air pollution, viewsheds, clear skies, collection methods, land disturbance, and emissions when considering utility-scale projects.

24. The County shall encourage residents to replace existing wood stoves and fireplaces with EPA-approved units.

25. The County supports biomass energy production through the distribution of forest thinning materials to residents for firewood and for use by utility-scale facilities if the impacts of these facilities on the public health, wildlife, air quality, and the natural environment of nearby communities can be avoided, minimized, or mitigated.

26. The County will continue to research and support education on the various alternative energy resources and options.

27. The County will support the agreement to cease the operation of conventional coal-fired power generation at the NGS no later than December 22, 2044.

IMPACTS OF ENERGY PRODUCTION

The location of utility-scale projects can greatly alter their impact on wildlife. Impacts to wildlife can be minimized by properly siting wind facilities and employing mitigation

strategies such as adjusting turbine rotation speeds. Multiple technologies (including photovoltaic and solar thermal generation) and mounting options are available to increase the effectiveness of photovoltaic panels; these technologies can have significantly different impacts on the landscape. Ground-mounted, utility-scale, solar facilities may require extensive clearing of vegetation, grading, and fencing. These facilities thus have the potential to eliminate or fragment large areas of intact ***habitat*** for a range of wildlife species and disrupt ***wildlife movement areas***. Conversely, utility-scale rooftop projects avoid and minimize these impacts to land and wildlife.

Some utility-scale projects may conflict with existing goals and policies because of concerns about water availability and quality. Given the county's arid environment, water-intensive, utility-scale energy projects are not as favored by the County. Protecting our water resources is a high priority, as outlined in the "Water Resources" chapter.

Other impacts associated with utility-scale energy production include those related to introducing noxious weeds, disturbing large land areas, constructing new roads and infrastructure, and obstructing scenic viewsheds, as well as impacts on neighbors such as noise, lighting, and perceived reduction of property values. The environmental concerns related to traditional energy development are significant; they range from health impacts such as mercury emissions and the effects of microscopic particles on respiratory systems to the global climate-altering effects of greenhouse gases.

The need for new transmission lines and substations must be considered in approving any utility-scale energy project. These auxiliary facilities have similar impacts as the projects themselves, such as large area land disturbance, wildlife collisions, fragmentation of habitat, disturbance of panoramic viewsheds, nighttime lights, increased noise levels, and other negative impacts on neighbors. Building fewer and shorter transmission lines and substations can considerably reduce these impacts. Therefore, it is preferable for projects to be located as close as possible to existing interconnection points.

New technologies are emerging at a rapid pace. When considering projects, the County will weigh the benefits against the costs to human health, wildlife, water use and quality, vegetation, erosion, noise, views, dark skies, and other treasured elements of Coconino County.

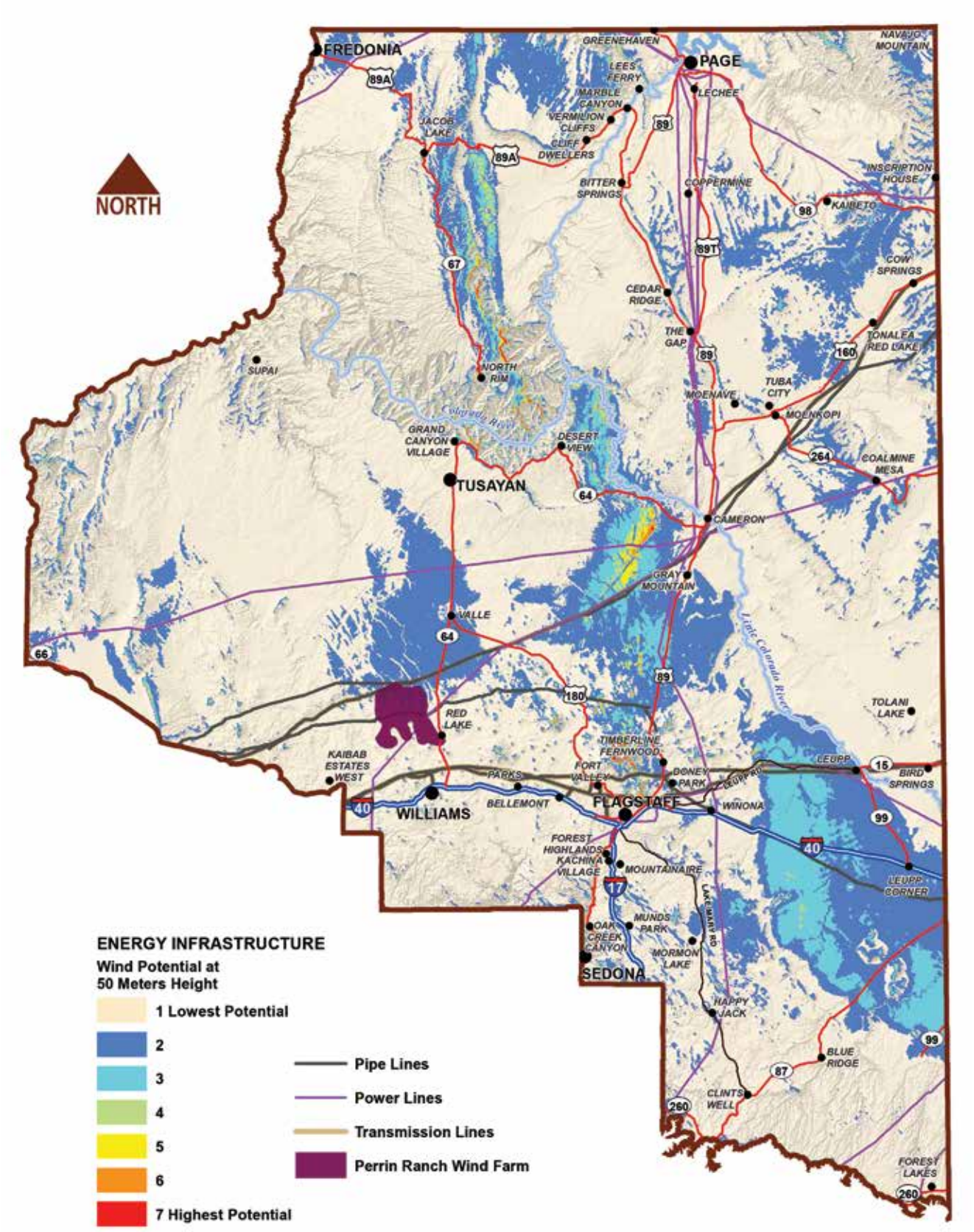
GOAL

Increase the use of technologies and strategies to reduce pollution, environmental degradation, and negative health impacts associated with energy production.

POLICIES

28. The County supports technologies and procedures that protect air quality and visibility, viewsheds, public health, and the conservation of water.

29. The County will promote the development of small-scale carbon offsetting techniques through land use planning, open space, and the Sustainable Building Program.



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Implementation

INTRODUCTION

The *Coconino County Comprehensive Plan* is not just a land use and transportation plan; rather, it is a policy document that guides decisions about growth, ***development***, and services. The County intends to align, as much as possible and reasonable, its annual budget, ***Capital Improvement Plan (CIP)***, and future bonding programs with this Plan. County actions must fully consider its ***vision***, goals, and policies. Over time, the policy documents—such as facilities expansion plans and development review manuals—of County agencies will be reviewed and adjusted as necessary to ensure share the same path.

By state law, decisions of land use change must and will conform to the adopted *Comprehensive Plan*. Like all plans, this *Comprehensive Plan* is understood to be a "living document"—one that allows for change in response to changing circumstances, extraordinary opportunities, or critical needs. For the Plan to stay relevant, it should be reviewed periodically to respond to changes in economic, physical, environmental, or social conditions. It must, however, per *ARS §11-805*, be updated or readopted at least once every 10 years to ensure that it is still consistent with the overall County vision.

The test of any plan is its successful implementation. This chapter provides actions necessary to implement the goals and policies of this Plan. All goals and policies are of equal importance and must be evaluated as the County considers amendments and updates, development proposals, infrastructure projects, and the development or refinement of programs or services.

COLLABORATION

The County will continue to work collaboratively with the ***Flagstaff Metropolitan Planning Organization (FMPO)***, the various municipalities, public land management agencies, ***Arizona State Land Department (ASLD)***, sovereign tribal nations, and private landowners to effect the Plan's implementation and the potential implications and changes to the county and region. Most projects will involve a level of participation with the public, other jurisdictions, and agencies. However, if one entity can be identified as a collaborative partner, they have been named as such in the list of projects below.

PROCESS FOR IMPLEMENTATION

This implementation plan will be reviewed annually to track progress and to establish and prioritize action items for the coming year. The ***action items*** in the table are listed in random order and the annual review will determine priorities for work planning and annual budget review.

ACTION ITEMS

- ***Project Specific***: These tangible products have a beginning and an end and generally are one-time activities that go beyond work that is conducted as part of daily business.

- ***Ongoing Programs***: These program-related activities require an ongoing human component to develop and administer them—for example, a sustainable buildings program or a certified local government program.

ACTION ITEM	TYPE	WHO
Update the *Zoning Ordinance* to further implement the goals and policies of the *Comprehensive Plan*. To include, but not be limited to, energy component, design standards, streamlined process, and enhanced zoning districts.	Project Specific	Community Development
Update the *Subdivision Ordinance* to further implement the goals and policies of the *Comprehensive Plan*. To include, but not be limited to, the ability to use conservation-based planning techniques when developing land, the lot-split process, and incentives to develop land through the subdivision process vs. lot split.	Project Specific	Community Development
Develop new area plans for areas of growth with priority for the I-40 corridor, east and west.	Project Specific	Community Development
Continually review and update area plans. Give particular focus to the definition and identification of activity centers and growth areas.	Project Specific	Community Development
Continue to work collaboratively to address water supply and demand concerns across the county by coordinating with and amending state and regional policy and continuing to identify possible incentives for water conservation.	Ongoing Program	County Departments Municipalities Agencies & Entities
Develop and coordinate an invasive plant/weed management program both internally and as regulation.	Ongoing Program	County Departments Municipalities Agencies & Entities
Develop a cooperative position for a plant community liaison to facilitate efforts with state and/or federal agencies to assess, maintain, and restore healthy plant communities through coordinated education, outreach, and management.	Ongoing Program	County Departments Municipalities Agencies & Entities
Define and identify essential community gateways. Develop policies and design guidelines for gateways and scenic corridors to enhance the value and amenity of these areas. Partner with state and federal programs in identifying funding sources for planning and development.	Project Specific	Community Development
Coordinate with jurisdiction, agencies, and other entities to implement multimodal plans and projects.	Ongoing Program	County Departments Municipalities Agencies & Entities
Identify *Comprehensive Plan* policies that would be strengthened by the inclusion of metrics to assess success or implementation of the policy. Begin to establish and use metrics to assess select policies.	Ongoing Program	Community Development

ACTION ITEM	TYPE	WHO
Work to incorporate the outcomes of the County's *Community Health Improvement Pla*n into future land use decision-making.	Ongoing Program	County Departments
Enhance the advocacy of County interests in other statewide and regional planning mechanisms and coordinate with other jurisdictions and agencies to ensure that projects within Coconino County are consistent with the *Comprehensive Plan* goals and policies	Ongoing Program	County Departments Municipalities Agencies & Entities
Create a Resource Information System with publically available information as a one-stop shop for best available information to help in land use and development planning as well as decision-making. Prioritize information for areas of likely growth, including the *Regional Plan* and area plan boundaries.	Ongoing Program	County Departments Agencies & Entities
Work with private land managers, AGFD, ASLD, BLM, USFS, tribal entities and others to prevent the fragmentation of wildlife movement areas. Analyze the cumulative impacts of development, steps to mitigate, and steps to maintain and enhance native ecosystem; use the recent wildlife corridor study and continue to enhance recent open space acquisition.	Ongoing Program	Community Development County Departments Municipalities Agencies & Entities
Use tools such as partnerships, donations, easements, TDRs, and the purchase of development rights to preserve open and working lands.	Ongoing Program	County Departments Agencies & Entities
Create a staff position to ensure the implementation of the plan and to develop educational programs and materials for Planning & Zoning Commissioners, the BOS, public, development community, and other stakeholders to inform about the *Comprehensive Plan* and planning trends, innovations, and current best practices.	Ongoing Program	Community Development
Develop a TDR ordinance for the county.	Project Specific	Community Development
Develop an expert "resource/advisors" list to gain expert advice for decision-making processes.	Project Specific	County Departments

ACTION ITEM	TYPE	WHO
Create a mechanism to communicate and coordinate internal (Coconino County) awareness and consistency with goals and policies of the *Comprehensive Plan*. Ultimately, the Plan should provide guidance to departmental budgets, work plans and the Capital Improvement Program.	Ongoing Program	County Departments
Use the Sustainable Building Program to assist in the design of community and County projects and operations to ensure the application of *Comprehensive Plan* goals and policies.	Ongoing Program	Community Development County Departments
Work to enhance relationships with ECONA, SEDI, chambers of commerce, and other advocacy groups to promote economic development opportunities across the county. Reduce unnecessary impediments to business attraction within the development process.	Ongoing Program	Community Development
Use technology to enhance public participation from all areas of the county including, but not limited to, remote participation in meetings and hearings, increased public notice, and mobile and remote community health and education services.	Ongoing Program	County Departments
Develop a communication plan to distribute the *Comprehensive Plan* and other applicable planning documents. Work to create and provide web-based access to enhanced maps related to Plan goals and policies. Ideally, these maps will be new layers viewable on Parcel Viewer.	Project Specific	Community Development
Develop a utility-scale energy ordinance to give developers more clear direction on the appropriate siting of utility-scale projects.	Project Specific	Community Development

Glossary of Terms

100-Year Flood: A flood that has a 1 percent chance of being equaled or exceeded in any given year.

40-Acre Lot Development, 40-Acre Ranchettes, Ranchette Development: A division of land into parcels of 36 acres or more, designated in the Arizona Revised Statutes (ARS) as "unsubdivided lands."

A

Access: The means for pedestrians, vehicles, and other travel modes to enter or leave a property safely and effectively.

Access Management: A planning technique used to maintain the capacity and safety of roadways by regulating the way vehicles enter and leave adjacent properties.

Action Item: A task that is designed to implement one or more policies and that identifies who will perform the task as well as when and how the task will be completed.

Active Management Area (AMA): Defined under *ARS §45.402* as a geographic area where groundwater is managed to reduce localized overdraft and achieve long-term balance of what is removed and replaced in aquifers.

Active Recreation: A type of recreation that requires areas and facilities for activities such as softball, baseball, football, soccer, golf, tennis, basketball, and various forms of children's play.

Activity Centers: Mixed-use centers that vary by scale and activity mix depending on location. They can include commercial, retail, offices, residential, shared parking, and public spaces.

Adaptive Reuse: Conversion of obsolete or historic building(s) or structure(s) from their original or most recent use to a new use.

Affordable Housing: Owned or rented housing costing less than 30 percent of a household's total gross income, assuming that this income equals the median for a county or an area.

Agritourism: Tourism that focuses on the enjoyment of, or education about, agricultural and ranching activities.

All-American Road: A Scenic Byway road that meets at least two of the six "intrinsic qualities" required by the Byway designation. All-American Road designation means that a road has qualities that are unique and important enough to be a tourist destination unto itself. *See also: Scenic Byway*

All-Terrain Vehicle (ATV): *See also: Off-Highway Vehicle*

Aquifer: An underground geologic formation that contains sufficient saturated, permeable material to yield significant quantities of groundwater to wells and springs.

Area Plan: An official amendment to the *Coconino County Comprehensive Plan* that reflects the local residents' vision of the future, contains goals and policies for development,

and provides guidance for decision makers. An area plan may serve a community, specific neighborhoods, or rural area. *See also: Rural Planning Area, Growth Boundary*

Arizona Corporation Commission (ACC): The state agency with regulatory responsibility for incorporation, securities, railroad and pipeline safety, and utilities.

Arizona Department of Environmental Quality (ADEQ): The agency with regulatory responsibility for air and water quality, as well as for the storage, treatment, and disposal of solid and hazardous waste.

Arizona Department of Transportation (ADOT): The agency responsible for developing, operating, and maintaining the state and federal highway infrastructure.

Arizona Department of Water Resources (ADWR): The agency with regulatory responsibility for managing surface water and groundwater resources in Arizona.

Arizona Earthquake Information Center (AEIC): An institution within the Geology Department of Northern Arizona University that conducts research and distributes information on Arizona earthquakes.

Arizona Game & Fish Department (AGFD): The agency charged with conserving, enhancing, and restoring the state's diverse wildlife resources and habitats.

Arizona Preserve Initiative (API): A program for cities, counties, and other organizations to petition the Arizona State Land Department to reclassify State Trust lands with high environmental protection or open-space values for conservation. To qualify, lands must be purchased within 8 years of reclassification.

Arizona Revised Statutes (ARS): Laws adopted by the Arizona State Legislature.

Arizona State Land Department (ASLD): The agency responsible for managing State Trust lands and resources to enhance values and optimize economic returns for Trust beneficiaries.

Arterial Roadway: Roadways designed to move through-traffic efficiently, at speeds as high as can be reasonably allowed, in view of safety considerations and capacity.

Average Daily Traffic (ADT): The average number of vehicles passing a fixed point during a 24-hour timeframe; a convention for measuring traffic volume.

B

Biodiversity or Biological Diversity: The variety, richness, and complexity of life and organisms among species, populations, habitats, and ecosystems.

Biomass: Plant material, used for the production of fuel alcohol, nonchemical fertilizers, and energy. Biomass sources may be trees, plants, waste products from harvesting, milling, or agricultural production or processing.

Board of Supervisors (BOS): The five elected officials, each representing a geographic district, that govern Coconino County.

Brownfields: A real property on which the expansion, redevelopment, or reuse may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Bureau of Indian Affairs (BIA): The federal government responsible for managing the 56 million acres of land held in trust by the U.S. for American Indians, Indian tribes, and Alaska Natives.

Bureau of Land Management (BLM): The federal agency within the U.S. Department of the Interior that administers 262 million acres of America's public lands, located primarily in 12 western states.

C

Capital Improvement Plan (CIP): An annually updated document that describes transportation, flood control, and park improvements, along with other capital projects and expenditures that are programmed for a set period, usually 5 years.

Certified Local Government (CLG) Program: A preservation partnership between local, state, and national governments focused on promoting historic preservation at the grass roots level.

Checkerboard Area: An area characterized by a mix of land ownership or land management, often with every other section under different ownership most commonly, State Trust land and private sections in northern Arizona.

Circulation System: Transportation infrastructure that fulfills access and mobility needs for people and goods.

Clean Energy: Electricity generated at a facility placed in service after 1991 using renewable energy, qualified renewable biomass, natural gas, hydropower, nuclear power, or qualified waste-to-energy; electricity generated at a facility placed in service after enactment that uses qualified combined heat and power (CHP), generates electricity with a carbon-intensity lower than 0.82 metric tons per megawatt-hour (the equivalent of new supercritical coal), or as a result of qualified efficiency improvements or capacity additions at existing nuclear or hydropower facilities; electricity generated at a facility that captures and stores its carbon dioxide emissions.

Cluster Development: A development technique that concentrates buildings and/or lots on a portion of the site to allow the remaining land to be permanently used for recreation, open space, habitat, and/or conservation of environmentally sensitive features.

Coconino Community College (CCC): A 2-yea post-secondary institution that offers certificate programs, associate of arts degrees, associate of science degrees, plus many other educational and vocational programs. CCC maintains facilities in Page, Williams, Grand Canyon, and Flagstaff.

Coconino County Natural Resource Information System (CCNRIS): An inventory database of environmental assets maintained through a coordinated effort between the County and other cooperating agencies.

Coconino Parks and Open Space Program (CPOS): A program of the Coconino County Parks & Recreation Department to identify and conserve open space, natural areas, and lands with high recreation and scenic value.

Collector Roadway: Typically, a rural route of primarily intracounty importance that funnels traffic between local streets and the arterial roadway system. *See also: Minor Collector and Major Collector*

Community: A subarea of the county consisting of, but not limited to, public/semipublic, residential, and commercial land uses sharing a common identity either as incorporate communities or unincorporated areas.

Community-Based Policing: A law enforcement approach where police officers work directly with residents to actively identify and solve problems in the local community.

Community Character: A community's design, viewsheds, gathering places, and historic and cultural resources, as well as its environmental characteristics such as natural quiet and dark night skies. Fundamental to a vibrant community is the ability to communicate with neighbors, work together toward common goals, and enjoy the company of each other.

Community Development Department (CD): The County department responsible for planning and zoning, building permits and inspections, floodplain management, and special districts.

Commuter: A person who travels regularly from one place to another place (for example, from a rural area to a city) and back.

Comprehensive Plan: A statement of the County's desired future, intended to serve as the primary decision-making guide for growth and development.

Conditional Use Permit: A permit issued by the Planning & Zoning Commission for a use that is allowed within a zoning district after a public hearing. With approval, the Commission typically applies specific conditions on the location and operation of this use.

Conservation: The sustainable management of resources in the natural environment to ensure the continued integrity of healthy, functioning ecosystems.

Conservation Easement: A legal property interest or right granted by the landowner to another party to maintain or limit use of the land to conservation purposes, typically to maintain its natural state and preclude future development.

County Road Improvement District (CRID): A district that may be established to improve roadways, including building the road or roads to County standard with related structures such as sidewalks, curbs, gutters, culverts, bridges, tunnels, etc. Improvements are financed through the sale of bonds. The BOS sits as the district's Board of Directors.

Crime Prevention Through Environmental Design (CPTED): A community planning approach that promotes designing or modifying the environment to reduce opportunities for crime. *See also: Community-Based Policing*

Critical Habitat: A federally designated area that is determined to be essential for the conservation, management, and survival of a threatened or endangered species.

Cultural Landscape: A visual demonstration of traditional interactions between humans and the natural environment over time.

Cultural Resources: An aspect of a cultural system that is valued by or significantly representative of a culture, or that contains significant information about a culture.

Cultural Site: A geographical area or feature deemed sacred or significant because of its traditional, cultural, or religious significance or its ceremonial use.

D

Defensible Space: The area between a structure and a potential oncoming wildfire where the vegetation has been modified to reduce the threat of ignition. This area provides an opportunity to "defend" the structure. *See also: Survivable Space*

Density Bonus: An additional number of units or development capacity allowed in exchange for providing certain public benefits or amenities, such as parks, open space, or affordable housing.

Design Review Overlay Zones (DROs): A zoning overlay district applied to specific geographic boundaries (typically within an area plan) that establishes guidelines for new commercial, industrial, multifamily, public, and semipublic uses. DROs require a review and approval process for exterior design, materials, textures, colors, signs, lighting, fencing, and landscaping but do not apply to single-family residential construction.

Developed Land: Land that has been subjected to construction, reconstruction, conversion, structural alteration, or relocation; mining, excavation, grading, landfill, or significant land disturbance; or any use or extension of the use of land.

Development: Any human-made change to improved or unimproved land.

Development Fee: *See: Impact Fee*

Development Project: A project that requires approval by the Planning & Zoning Commission and/or the BOS.

Discharge: The flow of water in a stream, ditch, or canal, or the outflow of groundwater from a flowing well or spring.

Distributed Energy Systems: The generation of electricity in small amounts from many locations.

Disturbed Site: An area of land that has been subject to clearing, cutting, excavating, filling, or grading; a site that has altered land topography or vegetative cover.

E

Ecological Process: The interactions among ecosystem components that govern their long-term functioning.

Ecosystem: The naturally interacting community of plant and animal species and their physical environment.

Ecosystem Services: The suite of benefits that humans get from the natural environment including such things as food production, water filtration, waste decomposition, crop pollination, and aesthetic amenities.

Ecotourism: Tourism that focuses on enjoyment of the environment or natural resources.

Effluent: Liquid waste or sewage, treated or untreated, discharged to the environment. *See also: Wastewater*

Emergency Egress: An alternate means or path for leaving an area or structure in the event of an emergency.

Environmentally Sensitive Features: Elements in the landscape that play a particularly large role in supporting wildlife and plant diversity and are, at the same time, especially sensitive to degradation. These are determined by best available science and include floodplains, springs, stream corridors, wetlands, threatened and endangered species habitat, old growth, or rare vegetation, and steep slopes.

Environmentally Sensitive Design Techniques: *See: Integrated Conservation Design*

Erosion: The wearing away of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, wind, and underground water.

Ethno-tourism: Tourism that focuses on the enjoyment of, or education about, indigenous people and cultures.

F

Fault System: An area characterized by interconnected geologic faults. *See also: Northern Arizona Seismic Belt (NASB)*

Fee-Simple Lands: Privately owned lands.

Federal Aviation Administration (FAA): The federal agency charged with primary responsibility for the safety of civil aviation.

Federal Emergency Management Agency (FEMA): The federal agency responsible for reducing the loss of life and property and protecting the nation's critical infrastructure from hazards.

Federal Highway Administration (FHWA): The federal agency responsible for developing, maintaining, and funding the federal roadway system.

Flagstaff Metropolitan Planning Organization (FMPO): The organization with lead responsibility for developing transportation plans and programs for the greater Flagstaff urban area; consists of the City of Flagstaff, Coconino County, and ADOT.

Flagstaff Regional Plan 2030: The general plan for the City of Flagstaff that is a statement of the community's desire for the future, intending to serve as the primary decision-making guide for growth and development within the Flagstaff Planning Area.

Flagstaff Urban Trail System (FUTS): A system of 130 miles of recreational and alternative transportation pathways (50 miles built as of 2015) within Flagstaff and connecting to surrounding national forest areas.

Floodplain: Any land area (typically adjoining a river, stream, lake, or other body of standing water) that is susceptible to inundation by a 100-year flood.

Floodplain Management Overlay Zone (FPM): An overlay zone that establishes regulations for developing in floodplains to minimize flood-related losses. *See also: 100-Year Flood*

G

Gateway: An entrance into a community or a specific area, typically along a major transportation corridor or adjacent to a national park or monument.

Gateway Communities: Communities situated along roadway corridors or adjacent to national parks, monuments, and recreation areas, with commercial and residential development providing services and amenities for visitors.

General Plan: A statement of an incorporated community's desired future, intended to serve as the primary decision-making guide for growth and development for the jurisdiction.

Geographic Information System (GIS): A means of displaying and analyzing data associated with points or areas on maps. This data-management system may be used to describe land uses or physical attributes such as soil or vegetation type.

Goal: A broad statement of desired outcomes to which effort is directed in order to bring a community closer to its overall vision of the future.

Gray Water: Wastewater, collected separately from sewage flow, that originates from a clothes washer, bathtub, shower, or sink, but not from the kitchen sink, dishwasher, or toilet. *See also: Reclaimed Water*

Grazing: The consumption of standing forage (edible plants) by wildlife and livestock on rangelands or fenced pasture. Livestock grazing is usually associated with commercial uses related to ranching.

Greenway: A linear open space established along a natural corridor for conservation, recreation, or circulation purposes.

Groundwater: The water under the surface of the earth regardless of the geologic structure in which it is standing or moving. Groundwater typically discharges via wells or springs. *See also: Surface Water*

Groundwater Management Act (GMA): The state legislation that created the Arizona Department of Water Resources for managing groundwater resources in Arizona and established Active Management Areas and Irrigation Non-Expansion Areas.

Growth Boundary: A line denoting the limit of areas where growth is to be encouraged or accommodated. These lines denote areas that have been established by public processes to reflect desired areas for future growth based on availability of infrastructure or local decisions about community character or other important values. The growth boundaries that apply to the *Comprehensive Plan* are the urban growth and rural growth boundaries established by the *Flagstaff Regional Plan* and any future growth boundaries that may be established by the BOS through the area plan process. *See also: Rural Growth Boundary, Urban Growth Boundary, and Area Plan*

Guiding Principle: A set of statements, based on conservation-based planning, ecological science, and decision-making principles that form the basis of the *Coconino County Comprehensive Plan's* goals and policies.

H

Habitat: The physical and biological environment where an organism lives. Habit includes such components as cover, food, shelter, water, and breeding sites.

Habitat Connectivity: Physical and biological conditions that join blocks of habitat so that animals can move between them. Such connectivity can be severed by natural causes, but most often is severed by human modification of the landscape.

Habitat Fragmentation: The division of contiguous tracts of wildlife habitat into progressively smaller patches and isolated areas. Fragmentation often occurs when wildlife movement areas are converted to more narrowly defined wildlife corridors; it can sometimes deplete a habitat area.

Hauled Water: Water transported by tank from its source to an area where it is otherwise unavailable.

Hazmat: Hazardous materials; often references a spill or other incident that releases hazardous materials to the environment.

Health Impact Assessments (HIA): A structured process that uses scientific data, professional expertise, and stakeholder input to identify and evaluate the public health consequences of proposals and suggests actions that could be taken to minimize adverse health impacts and optimize beneficial ones.

Heritage Area: An area or site where cultural monuments, natural areas or features, historic trail systems, or historic land use patterns may have cultural significance, provide a physical link to historic events, or be of exceptional value.

Historic Preservation: The use of measures that foster conditions under which modern society and prehistoric/historic resources can exist in harmony and fulfill the social, economic, and other requirements of present and future generations.

Historic Trail: A nationally or regionally significant historic route, along with the remnants and artifacts of its historical use.

I

Impact Fee: A charge on new development to pay for the construction or expansion of off-site capital improvements that are necessitated by and benefit the new development.

Impermeable: A term describing a medium such as unfractured rock that cannot transmit water.

Implementation Plan: A list of action items designed to implement the goals and policies of a comprehensive plan.

Improved Land: *See: Developed Land*

Improvement District: A local unit of government (other than a City or County), authorized and regulated by statute, that is established for road improvements, water control, irrigation, fire, hospital, sanitary districts, and regional air quality control with taxing authority.

Incentive: In Coconino County, an action that is meant to generate desired outcomes such as integrated conservation design or housing affordability. While incentives potentially come in a variety of forms, the County rarely has funds to support projects with financial subsidy. It does have the ability to reward projects that pursue desired outcomes with strategies that could include but are not limited to regulatory flexibility, density bonuses, reduced timeframes, alternative fee structures, increased levels of customer service, and publicity.

Infill: The development of new housing or other structures on scattered vacant sites within built-up areas.

Inholding: Privately owned land that is completely surrounded by an incorporated community or by congressionally designated lands, such as BLM, USFS, NPS, or a sovereign tribal nation.

Inter-basin Transfers: The transfer of water from one groundwater basin to another.

Integrated Conservation Design: A development concept that considers site characteristics and layout in the larger context of surrounding parcels. Integrated conservation design preserves important and unique natural features such as open space, viewsheds, scenic corridors, and wildlife habitat.

International Building Code (IBC): International standards for protecting life and property by regulating the design, construction, quality of materials, use, and occupancy of structures.

Interpretive Education: Methods of communicating information about the natural and/or cultural resources at a specific site or along a trail. Tours, signs, and brochures are a few tools available for interpreting resources.

Invasive, Non-native Species: A plant species not historically found in the local area. When introduced into an area, these species proliferate, replacing native species and reducing biodiversity. *See also: Noxious Weeds*

Irrigation: A means of providing water to agricultural or landscaped areas, typically involving a system of canals and/or pipes and sprinklers.

J K

L

Land Use: A term describing how land is occupied or utilized.

Landscape: The unique patterns, structures, and features such as landforms, vegetation, soil, and waterways that distinguish one part of the earth's surface from another.

Landscaping: The placement of vegetative cover, trees, rocks, or other materials to improve environmental quality, mitigate land use impacts, and enhance the visual appearance of development. *See also: Xeriscape*

Leadership in Energy & Environmental Design (LEED): A building rating system based on the amount of energy savings achieved through efficient siting and use of building materials.

Level of Service Standards (LOS): A methodology for determining a community's need for new facilities or infrastructure based on existing conditions, demand, population, and land area.

Livable Wage: The minimum income needed for a worker to meet basic needs and local cost of living.

Local Roadway: A street that provides access to land parcels (primarily residential) adjacent to the collector network and serves travel over relatively short distances. *See also: Major Collector, Minor Collector, and Collector Roadway*

Lot Split: A division of land into five or fewer parcels. *See also: Wildcat Subdivision*

Locally Undesirable Land Use (LULU): A site or facility such as a landfill, communications tower, or and high-voltage transmission line that constitutes a real or perceived nuisance.

Low-Impact Development (LID): A land planning and engineering design approach to manage stormwater runoff; a set of tools such as swales, detention basins, and impervious pavement that retain storm water on site.

M

Major Collector: A type of roadway that links major areas of development, including rural activity centers and residential, commercial, and industrial land uses and connects minor arterials, minor collectors, and local roads. *See also: Collector Roadway*

Manufactured Home: A dwelling unit built after June 1976 to standards established by the U.S. Department of Housing and Urban Development. Manufactured homes are designed for year-round use.

Memorandum of Understanding (MOU): An agreement of cooperation that defines the roles and responsibilities related to an issue over which several organizations or agencies have concurrent jurisdiction.

Minor Arterial: A type of roadway or transportation corridor that links cities, towns, and other traffic generators. Minor arterials attract travel over long distances, provide intercounty and some intracounty service, and generally connect to other arterial roadways or collector roadways. *See also: Arterial Roadway*

Minor Collector: A type of roadway that primarily routes traffic from local roads to major collectors or minor arterials. *See also: Collector Roadway*

Mitigation: The act of eliminating, reducing, minimizing, or compensating for an impact to the environment using measures that directly or indirectly reduce the impact. Applicants must attempt mitigation actions in the following order: (1) avoid impacts by not taking part or all of a certain action; (2) minimize impacts by limiting the degree or magnitude of the action; (3) rectify impacts by repairing, rehabilitating, or restoring the environment; and (4) compensate for unavoidable impacts by replacing or providing substitute resources or environments.

Mobile Home: A dwelling unit built on a permanent chassis prior to June 1976 designed to be used without a permanent foundation, mobile homes can be transported in one or more sections and were not built to HUD or IBC standards.

Modular Home: A dwelling unit that is preassembled in a factory prior to delivery and final assembly. Built to Uniform Building Code standards with the same exterior materials customarily used on site-built dwellings, modular homes have a permanent foundation, a minimum roof pitch of 3 in 12, a width of at least 20 feet width, and at least 1 foot of roof overhang on all four sides.

Multimodal Corridor: Physical, linear areas containing the infrastructure that supports travel by both motorized and nonmotorized circulation. *See also: Multimodalism*

Multimodalism: A holistic view of circulation in which individual modes work together or within their own niches to provide users with the best choices of service. Multimodalism considers how policies for a single mode affect all other modes.

N

National Environmental Policy Act (NEPA): The legislation passed in 1969 to serve as the country's "national charter" for protecting the environment. NEPA requires environmental impact statements for all major federal actions that significantly affect the environment.

National Park Service (NPS): The federal agency within the Department of the Interior charged with preserving the natural and cultural resources and the values of the national park system.

National Pollutant Discharge Elimination System (NPDES): A provision of the *Clean Water Act* that prohibits the discharge of pollutants into waters without a special permit from the U.S. Environmental Protection Agency, state, or tribal government.

Native Species: A species that originates and occurs naturally in a particular region or environment.

Natural Area: Public land set aside to conserve and protect natural resources.

Natural Environment: The system of plants, animals, soils, water, and air that supports ecological processes.

Natural Hazard: A significant threat to life and property produced by natural conditions or processes such as tornadoes, faults, severe soil erosion, slumping, wildfire, or floods.

Neighborhood Commercial Use: A use that generates most of its business from local residents.

Neighborhood Park: A developed site that features recreation facilities primarily for local use such as sports fields, basketball courts, and playgrounds, and as a community amenity, provides a place for family gatherings, exercise, and relaxation. Neighborhood parks may be operated by homeowner associations, neighborhood groups, or in some cases a local government entity.

Net Energy Generating: The difference between the energy expended to harvest an energy source and the amount of energy gained from that harvest. When comparing net energy for different sources of power, calculations need to be consistent and account for the entire process of generating power.

Nonconforming Use: A use or activity that was lawful prior to the adoption, revision, or amendment of the *Zoning Ordinance* or applicable zoning classification that does not conform to present requirements.

Nonpoint-Source Pollution: Pollution that originates from many diffuse sources (such as urban areas, parking lots, agriculture, recreation, and construction) and that is carried by rainfall, snowmelt, irrigation, and local runoff.

Northern Arizona Council of Governments (NACOG): A nonprofit corporation representing local governments to provide a variety of housing, workforce development, planning, and health and human services in Apache, Coconino, Navajo, and Yavapai Counties.

Northern Arizona Seismic Belt (NASB): A complex of major geologic fault systems in northern Arizona, including the Cataract Creek, Mesa Butte, and Bright Angel fault systems.

Northern Arizona University (NAU): Located in Flagstaff, one of three state universities in Arizona with undergraduate and graduate degree programs.

Noxious Weeds: Any parasitic or foreign plant that can injure crops, other useful plants, agriculture, livestock, fish, or wildlife resources, or public health; any plant on the federal Noxious Weed List or the Arizona State Noxious Weed List. *See also: Invasive, Non-native Species*

O

Off-highway Vehicle (OHV): A motorized vehicle used for travel in areas that are normally inaccessible to conventional highway vehicles. OHVs include sport utility vehicles, pickup trucks, dirt motorcycles, dune buggies, four-wheel-drive and high-clearance vehicles, snowmobiles, and all-terrain vehicles (ATV).

Open Space: A primarily undeveloped landscape that provides scenic, ecological, or recreational values or that is set aside for resource protection or conservation; an area of managed production such as forestland, rangeland, or agricultural land that is essentially free of visible obstructions.

Overdraft: The removal of more groundwater from an aquifer than is naturally replenished through recharge.

Overlay Zone: A zoning district that encompasses one or more underlying zones and that imposes additional requirements above that required by the underlying zone.

P

Para-Transit: Transportation service for persons who, because of a disability, are unable to use the fixed bus-route system.

Park: An area set aside for public enjoyment, typically, but not always, managed by a government entity. Parks may include facilities for recreation.

Passive Recreation: A type of recreation or activity that does not require the use of organized play areas or developed facilities.

Percolate: To flow downward to the water table through the soil or other porous medium.

Planning & Zoning Commission (P&Z): A 10-member volunteer citizen's board in Coconino County that is responsible for reviewing applications for conditional use permits, subdivisions, rezoning, and public right-of-way abandonment requests. Two members are appointed by each County Supervisor.

Policy: A specific, guiding statement that outlines the process for achieving a goal.

Pollution: The presence of contaminants in concentrations that degrade the natural environment or impact people's health, safety, and comfort.

Portal: A provisioning point that is intended to be more than just a trailhead, offering access to services such as campgrounds, motels, stores, and restaurants at strategic points along a major trail route or to the network of public lands and recreational areas connected by scenic corridors.

Potable Water: Water suitable for drinking and cooking purposes.

Prescribed Burning: The controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions. Prescribed burns are confined to a predetermined area to meet resource management objectives. *See also: Thinning*

Primitive Roadway: Roads located on easements or rights-of-way that have not been accepted for County ownership but have been open to the public since June 13, 1975. Designated by the BOS under *ARS §28-6706*, primitive roads receive limited maintenance (including snow removal) from the County.

Principle: Ecologically, a basic truth concerning the functioning of natural systems. *See also: Guiding Principle*

Private Inholding: *See: Inholding*

Private Roadway: A roadway that is located on an easement or right-of-way and has not been accepted for ownership or maintenance by a public entity.

Public/Semipublic Uses: Uses listed in the *Coconino County Zoning Ordinance* such as day care centers, preschools, hospitals, churches, educational institutions, libraries and museums, public parks, recreational facilities, and utilities.

Q

R

Rangelands: Grasslands, scrublands, and forestlands that provide habitat for wild or domestic grazing.

Recharge: The addition to, or replenishing of, groundwater in an aquifer by natural or artificial means.

Reclaimed Water: Wastewater that has been treated for reuse for purposes other than human consumption. *See also: Effluent and Gray Water*

Renewable Energy: As defined by the U.S. Energy Information Administration, an energy source that is regenerative or virtually inexhaustible.

Resiliency: The ability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change.

Right-of-Way: A strip of land acquired by reservation, dedication, purchase, prescription, or condemnation that is intended to be occupied by a road, cross-walk, railroad, power line, pipeline, water line, sanitary storm sewer, or other similar structure.

Riparian Area: An area surrounding a river or stream that supports an ecosystem of wildlife, vegetation, soils, and water.

Road Association: A privately organized and funded group of property owners that join together to collectively maintain private roads. The County is not involved in road associations.

Road Enhancement Improvement District (REID): A district that may be established for the purpose of enhancing one or more roads or highways and providing for ongoing maintenance of the enhancements, or a district that is converted from a county improvement district formed for road enhancement improvements that require ongoing maintenance. The district is governed by a local elected board.

Road Improvement & Maintenance District (RIMD): A district that is established to create, improve, and provide maintenance for a road that is not built to County standard. Roads improved and maintained through this type of district must be public. The district is governed by a local elected board.

Runoff: The portion of rainfall, snowmelt, or other water that flows along ground surface and eventually collects in basins or contributes to the flow of a stream.

Rural: Of or relating to the country, country people or life, agriculture, or ranching.

Rural Activity Center: A centralized, concentrated area of locally oriented commercial, public, and semipublic services and activities. Rural activity centers are identified by area plans and the *Flagstaff Regional Plan.*

Rural Arizona Watershed Initiative: A program funded by the State Legislature and initiated in 1999–2000 to help rural areas finance studies, projects, and programs related to groundwater resources.

Rural Character: The pastoral or rustic setting of a location, as defined by local residents according to their preferences and needs. The rural nature of the county differs from location to location and the level of rural character desired varies from resident to resident.

Rural Growth Boundary: The boundary line as shown on the Flagstaff Regional Plan map identifying certain lands in the unincorporated areas of the FMPO that are planned for rural development and any future rural growth boundaries that may be established by the BOS through the area plan process. See also: Growth Boundary and Urban Growth Boundary

Rural Planning Area: An area created by petition of owners of a majority of the property to prepare a plan that emphasizes voluntary, nonregulatory incentives for accommodating the continuation of traditional rural and agricultural enterprises; designated by the BOS under *ARS §11.806.D.3.* An existing example is the Diablo Canyon Rural Planning Area.

S

Scenic Byway: A road recognized by the U.S. Department of Transportation for having one or more of six "intrinsic qualities": archeological, cultural, historic, natural, recreational, or scenic. Created by Congress in 1991, this designation serves to preserve and protect the nation's scenic but less traveled roads and promote tourism and economic development.

Scenic Corridors: Roads, trails, and greenways that traverse areas with distinctive cultural, historic, natural, or other unique qualities. Many of the roads have state or federal designations such as Arizona's Historic or Scenic Roads (ADOT), National Scenic Byways, or All-American Roads. The character of the roads and the viewsheds that they (and the trails and greenways) access are worthy of conservation as they contribute significantly to tourism and the economy.

Scenic Road: A Scenic Road, Historic Road, or Parkway as designated by ADOT. The purposes and requirements of this designation are similar to that of the federal Scenic Byways program.

Section: One of 36 units of land within a given township, usually about 1 square mile (640 acres) in area.

Semipublic Uses: *See: Public/Semipublic Uses*

Sense of Place: A unique collection of qualities and characteristics—visual, social and environmental—that provide meaning to a location.

Sheet Flow: Overland flow that occurs outside of defined drainage channels over large areas at a uniform, shallow depth.

Smart Growth: A perspective, method, and goal for managing growth that focuses on its long- term implications and how it may affect the county, instead of viewing growth as an end in itself. Smart Growth promotes cooperation between often diverse groups to arrive at sustainable, long-term strategies that are designed to create livable communities, promote economic development, and protect open spaces, environmentally sensitive features, and agricultural lands; also, it promotes compact, mixed-use development and encourages a choice of travel mode: walking, cycling, and transit.

Social Trail: An unplanned, unauthorized path that developed informally and is not designated or maintained by an agency. *See also: Trail*

Solid Waste: Any garbage, refuse, sludge from a wastewater treatment plant and other discarded materials.

Species: Plants or animals grouped by common genetic attributes and assigned a scientific name. Species may also have common names.

Special Taxing District: A district established under Arizona Revised Statutes, Title 48, as a political subdivision of the state, with a specified geographical boundary, and approved by the County BOS. Such districts are governed by an elected board that has the rights to impose taxes for the limited purpose in which it was formed.

Spring: A point on the earth's surface where groundwater discharges from an aquifer.

State Historic Preservation Office (SHPO): A division of Arizona State Parks that is responsible for identifying and protecting Arizona's prehistoric and historic cultural resources.

State Trust Lands: Lands in Arizona that are held in trust and managed for the sole purpose of generating revenues for the 13 beneficiaries, the largest of which is Arizona's K–12 education. These lands were granted to the state under the provisions of the federal *Enabling Act* that provided for Arizona's statehood in 1912. ASLD manages approximately 9.2 million acres of State Trust lands within Arizona.

Stewardship: The long-term responsibility for and careful management of the environment, resources, and land.

Subdivision: The division of land into six or more lots, parcels, or fractional interests under 36 acres, for sale or lease, including lands divided as part of a common promotional plan; also, the resulting site of subdivided land.

Subdivision Ordinance: The set of regulations adopted by the BOS specifying the rules and standards for dividing land.

Surface Water: Water found in lakes, ponds, and reservoirs or flowing on the earth's surface within a stream, wash, creek, or other natural drainage channel. See also: Groundwater

Survivable Space: The area surrounding a structure that has been designed or modified to increase its likelihood of surviving a wildfire without active intervention by fire protection services. *See also: Defensible Space*

Sustainability: An interconnected approach for balancing current and future needs with regard to resiliency and vitality across the environment, economy, and society.

Sustainable Building: Building techniques and materials that minimize the use of non-renewable natural resources.

Sustainable Water Use: When human consumption rates do not exceed natural groundwater recharge rates and therefore do not impact aquatic ecological integrity or long-term water supplies for humans.

T

Thinning: The selective removal of trees and/or plants to restore the area to a more natural condition and/or open up a stand that is too thick for safety or management purposes. *See also: Prescribed Burning*

Threatened or Endangered Species (TES): Species listed by the U.S. Fish & Wildlife Service that have declined to a point where federal action is necessary for protection. Endangered species are considered more at risk than threatened species.

Threshold: Biologically, a tolerance level of a species or its habitat that, when exceeded, results in irreversible damage.

Traditional Cultural Practices: Activities that are customary to a specific culture or subculture of peoples that include land uses, handed-down over generations, such as the collection of native plants for medicinal and ritual purposes, that strengthen, maintain, and foster cultural identity.

Trail: A linear, multiple-use, public-access route for recreation or circulation.

Trail Easement: The property interest or right granted to a nonowner to travel across a specific portion of land for a specific or limited purpose.

Trailhead: A designated public access point to a trail that may feature informational signs as well as parking and restroom facilities.

Transfer of Development Rights (TDR): A transfer of the right to develop or build from one portion of a property to another portion, or from one property to another property.

Transit: A transportation mode that moves larger numbers of people than an automobile; generally refers to passenger service provided to the public along established routes with fixed or variable schedules at published fares. *See also: Para-Transit*

Transportation System Management (TSM): Cost-effective methods of improving existing transportation systems by reducing vehicle use, facilitating traffic flow, and improving internal transit management.

Tribal Trust Lands: Land owned either by a tribe or individual tribal member, the title of which is held in trust by the federal government (Department of the Interior). Most tribal trust land is within reservation boundaries, but tribal trust land can also be outside the boundaries of a reservation.

Treated Effluent: Wastewater discharge treated with physical, chemical, and biological processes to remove physical, chemical, and biological contaminants before being released to the environment. *See also: Effluent*

U

Undeveloped Land: Land that is not developed or used. *See also: Unimproved Land*

Unimproved Land: Land in a natural, predeveloped state. *See also: Undeveloped Land*

United Nations Educational, Scientific & Cultural Organization (UNESCO): An organization established in 1946 to contribute to world peace and security by promoting collaboration among nations through education, science, culture, and communication.

U.S. Environmental Protection Agency (EPA): The federal agency established in 1970 to consolidate a variety of federal research, monitoring, standard-setting, and enforcement activities related to protecting the natural environment.

U.S. Fish & Wildlife Service (USFW): The federal agency whose mission is to conserve, protect, and enhance fish, wildlife, and plants, along with their habitats.

U.S. Forest Service (USFS): The federal agency charged with managing public lands in designated national forests and grasslands for multiple uses.

U.S. Geological Survey (USGS): The federal agency that conducts research to provide geologic, topographic, and hydrologic information.

Urban: A highly developed area that contains a variety of residential, commercial, industrial, and cultural uses; an area where access to necessary infrastructure is readily available; land use densities and patterns are consistent with cities.

Urban Growth Boundary: The line as shown on the *Flagstaff Regional Plan* map indicating the boundary of urban land uses for the City of Flagstaff; a line within which urban growth should be contained. *See also: Rural Growth Boundary and Growth Boundary.*

User Fee: A charge for the use of a product, facility, or service.

Utility-Scale Energy Systems: The production of energy with the intent of producing power in excess of 120% of the energy used for on-site consumption.

V

Vacant Land: *See: Undeveloped Land*

Viability: Biologically, a state where a population maintains its vigor, long-term persistence, and potential for evolutionary adaptation.

Vision: An overall image of what the community and County want to be now and in the future.

W

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing pants that is recycled, burned, or disposed of in landfills or recycling facilities.

Wastewater: Used water drained from homes, business, and industries, primarily sewage flow. *See also: Effluent*

Water Conservation: Any beneficial reduction in water loss, waste, or use.

Water Harvesting: The collection of rain or snowmelt for retention and future use or recharge.

Water Supply System: The system for the collection, treatment, storage, and distribution of potable water from the supply source to the consumer.

Watershed: The land area that contributes runoff to a given stream, river, or reservoir.

Water Transfers: The exchange of water or water rights through willing buyers and sellers; also, the physical transfer of water by truck, pipe, or other conveyance system from one area to another. Water transfers typically involve movement from one watershed to another or from one aquifer to another.

Weed Management Area (WMA): A geographic area with a group of federal, state, city, and County managers and other stakeholders formed to address the problem of introduction and spread of invasive, non-native plants.

Wetlands: Areas that are inundated often enough to support plants and animals adapted to saturated soil conditions.

Wildcat Subdivision: A process under Arizona law that allows property owners to split parcels of land into five or fewer lots and sell them without having to adhere to County subdivision regulation requirements. This process is also known as lot splitting. In many cases, it results in residential areas that do not adhere to subdivision standards or infrastructure requirements, thus subverting many of the planning mechanisms implemented to ensure public safety and wellbeing. *See also: Lot Split*

Wilderness Area: A congressionally designated area managed by four federal agencies: BLM, USFWS, USFS, and NPS. Coconino County has areas, managed by the BLM and USFS, of undeveloped land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed to preserve its natural conditions.

Wilderness First Responder: An emergency medical training program designed for persons working or living in remote areas or other environments where immediate medical services, equipment, or 911 assistance are unavailable.

Wildland-Urban Interface (W/UI): The area in and around a community where the immediate or secondary effects of a wildfire would threaten a community's environmental, social, and economic values, causing serious detriment to the area's overall health and viability.

Wildlife Corridor: An often limited or constrained area providing connectivity to larger animal habitats. *See also: Wildlife Movement Area*

Wildlife Movement Area: A broad habitat area that allows animals to move from one region to another in relative safety. *See also: Wildlife Corridor*

Woodland: An area covered with woody vegetation, dominated by small trees such as piñon and juniper.

X

Xeriscape: Landscaping incorporating drought-tolerant, low-water-use, and typically native vegetation.

Y

Z

Zoning: The delineation of districts and the establishment of regulations governing the use, placement, spacing, and size of land and buildings.

Zoning Ordinance: A set of legally binding provisions adopted by the BOS to govern land development. Along with the *Subdivision Ordinance*, the *Zoning Ordinance* is used to implement the goals, and policies of the *Comprehensive Plan*.

Appendix A

PLACES OF COCONINO COUNTY

Native American Tribal Lands

NAVAJO: 27.7 percent of the Navajo Nation is located within Coconino County, representing approximately 3.2 million acres or around 27 percent of the County. The 2000 Census reported that there were 23,216 tribal members residing in the Coconino County portion of the reservation with a total of 5,736 occupied dwelling units. Over time the tribe's economy has diversified but varies from location to location. In some areas, especially those in Coconino County, ranching provides a livelihood for many tribal members. However, in 2012 the Twin Arrows Casino, located on Tribal Trust land near I-40, opened providing a wider variety of employment. The land was purchased through the Navajo-Hopi Land Commission to aid economic development to the former Bennett Freeze area. (The Bennett Freeze Act was lifted by President Obama in 2008.)

In 1989 the Navajo Nation purchased the 491,000 acre Boquillas Ranch located in western Coconino County directly adjacent to the Hualapai Reservation. The land remains in fee simple ownership and has been a working ranch since purchase. To date no requests have been made for these lands to be reclassified to Tribal Trust lands. It is possible they can be sold for development in the future, which could have a significant impact on the amount and type of development that occurs within that area of the county. The Navajo Nation has explored the possibility of developing a wind farm on the ranch

The Navajo Nation is unique to the tribes within Coconino County due to its vast size and style of tribal government. The tribal government is currently headquartered in Window Rock, Arizona with a 24-member council representing 110 separate chapters. There are 13 chapters that are either entirely or partially located in Coconino County. Due to the *Local Governance Act of 1998* chapter houses have gained certification for greater control of their planning and development processes. This Act allows each chapter to develop its own government after developing an approved management system, while continuing to regulate land use with a Community Land Use Plan (CLUP). Many chapters within Coconino County are working to acquire Local Governance Certification to better establish local control. This process has spurred additional communication, coordination of resources, and government to government partnerships between individual chapters and the County.

HOPI: The Hopi reservation is centered on three mesas at the southern edge of Black Mesa. The village of Oraibi is the oldest continually occupied village in the United States and has been in existence since 1100 AD. The reservation, with 673,456 acres, makes up 5.64 percent of the total land area within Coconino County. Today the Hopi reservation is surrounded entirely by the Navajo Nation. In the early 2000s, the Hopi Tribe was presented with $50 million from the U.S. Congress for purchasing additional land. A maximum of 500,000 acres of land purchased with this money can be taken into Tribal Trust status. To date the tribe has applied to Congress for 300,000 acres consisting of a mix of both private and State Trust lands located in the County southeast of Flagstaff to be taken into Tribal Trust status. If and when lands are taken into Tribal Trust status, development would no longer be subject to County regulations. The Hopi Tribe also works with the Navajo-Hopi Land Commission as some Hopi land was under the Bennett Freeze.

HAVASUPAI: The Havasupai reservation is located entirely within Coconino County and is located at the southwest corner of Grand Canyon National Park. The reservation occupies 188,077 acres or approximately 1.46 percent of Coconino County. Supai, the capital, is home to approximately 500 people and located in the Grand Canyon. The town can only be reached by trail or helicopter and contains more than 130 houses, a café, store, lodge, post office, school, churches and other buildings. The Havasupai government consists of a 7 member tribal council with elections held every two years. The Havasupai Tribe manages and operates its own water and sewer system. Electricity is provided and maintained by the Bureau of Indian Affairs. The Tribe manages and operates its own internet services and land line services are available. Health services are provided by the Indian Health Service from a limited service clinic. Head Start, elementary, and junior school education up to 8th grade is available. Today the tribe is the largest employer on the reservation and the main occupation is working for tribal enterprises related to tourism, with more than 20,000 visitors each year.

HUALAPAI: The Hualapai reservation includes 579,470 acres along 100 miles of the Colorado River and Grand Canyon and extends into three counties. That portion of the reservation located in Coconino County represents approximately 4.85 percent of the County. The Hualapai are represented by a 9 member tribal council. The Hualapai government provides emergency, cultural, educational, elderly, finance, Game and Fish, Head Start, health, human resources, natural resources and planning services. Economic development is tourism driven. In 1988, the tribe created Grand Canyon West as a tourist destination which includes the Grand Canyon Skywalk, suspended 4,000 feet above the canyon floor.

KAIBAB-PAIUTE: The Kaibab-Paiute reservation covers over 13,370 acres on the Arizona strip north of the Grand Canyon and straddles two counties in addition to southern Utah. That portion of the reservation located in Coconino County represents approximately 0.1 percent of the County. The tribe operates under a seven member council representing their six villages, and it operates a gas station and RV park. This land is also the home to Pipe Springs National Monument.

SAN JUAN SOUTHERN PAIUTE: The San Juan Southern Paiute are a newly recognized tribe and the tribe is currently in the process of petitioning the Bureau of Indian Affairs (BIA) for tribal lands. The future location of any Tribal Trust lands could have an impact on the County depending on their location and the types of uses that may occur on site to support the tribe. Currently they are predominantly located south of Tuba City and have an active tribal council.

Incorporated Cities & Towns

FLAGSTAFF: The City of Flagstaff has been a transportation and economic hub since its inception and is the Coconino County seat as well. Economic activities are centered on government, education, transportation, tourism, and NAU draws a potential workforce of educated millennials. The County coordinates development closely with the City of Flagstaff through the *Flagstaff Regional Plan 2030* which was also adopted by the Board of Supervisors in 2013. The Regional Plan identifies Rural Growth Boundaries and Rural Activity Centers within several of the County's adopted Area Plans and provides a higher level of detail in these areas. The *Coconino County Comprehensive Plan* identifies Flagstaff as a Gateway Community.

FREDONIA: Fredonia is the most northern town in Coconino County located at the intersection of U.S. Hwy 89A and State Highway 389 near the Utah border on the Arizona Strip. The location is important for connecting with residents on the Arizona Strip. Fredonia residents are closely tied to activities in Kanab, Utah as developed areas are adjacent to each other. Fredonia is the activity center for the unincorporated area of White Sage. The *Coconino County Comprehensive* Plan identifies Fredonia as a potential Gateway Community.

PAGE: The City of Page is located in the northern portion of the county near the Utah border off Highway 89 adjacent to Lake Powell. Today the economic structure supporting Page depends largely on tourism drawn by the Lake as well as the Salt River Project Navajo Generating Station. The census projections estimate that the 2015 population is 7,483 residents within the community. Nearby Greenehaven residents rely heavily on Page as an activity center and the *Coconino County Comprehensive Plan* identifies Page as a potential Gateway Community.

SEDONA: The City of Sedona is located in both Coconino and Yavapai Counties at the intersection of State Routes 89A and 179. Coconino County still administers the floodplain management program for the portion falling within the County boundaries which includes the uptown commercial area and adjacent residential areas. The Oak Creek Canyon Area Plan coordinates development in the area adjacent to and north of the City of Sedona. The *Coconino County Comprehensive Plan* identifies Sedona as a potential Gateway Community.

TUSAYAN: The Town of Tusayan incorporated in 2010. The Town adopted the 1995 County Area Plan as its first general plan but needed to update it in 2014 to meet State Statutes. As of 2014, a new general plan was adopted which increases its desire to be an economic hub. This community has served as the gateway to Grand Canyon National Park since its inception and depends upon tourism for economic sustainability. The *Coconino County Comprehensive Plan* continues to identify Tusayan as a potential Gateway Community.

WILLIAMS: The City of Williams is located 30 miles west of Flagstaff on Interstate 40 at the base of Bill Williams Mountain in the Kaibab National Forest. The City is well known for its connection with historic Route 66 and this *Comprehensive Plan* identifies the City as a potential Gateway Community for travelers to the Grand Canyon approximately 58 miles to the north. Much of the unincorporated County adjacent to Williams has been developed as residential areas.

Unincorporated Communities – with Area Plans

Coconino County Area Plans are adopted by the Board of Supervisors as amendments to the Comprehensive Plan. These Area Plans are heavily relied upon to guide development in the areas which they serve and were created through an extensive public participation process. Because reliance on the plans to guide development is significant, continual assessment and updating of the Area Plans is a priority for the Community Development Department. As such future development is preferred and expected to occur within these Area Plans as opposed to outside these areas in more remote parts of the County that are not adequately served with infrastructure.

Within the adopted Flagstaff Regional Plan 2030 Rural Growth Boundaries have been identified within portions of the following Area Plans: 1) Bellemont, 2) Doney Park,

Timberline, & Fernwood, 3) Fort Valley Highway 180 Scenic Corridor, 4) Kachina Village and, 5) Mountainaire. Additionally, within those Rural Growth Boundaries the Regional Plan has identified areas that might be appropriate for the establishment of Rural Activity Centers. However, the precise location, size, and land uses of these Rural Activity Centers within the above listed Area Plans has not been established; only that there may be a potential for such. What purpose, if any, for the establishment of a Rural Activity Center shall be vetted by the residents of the specific Area Plan through the Citizen Participation Process for an amendment to the Area Plan.

BELLEMONT: The Bellemont area is centered around the interchange on I-40, 8 miles west of Flagstaff, and includes all private lands approximately 1.5 miles east and west of the interchange, and is bordered on the south by the railroad and the north by national forest lands. Camp Navajo, an Arizona National Guard base, is located south of the railroad. The area has a mixed-use zoning classification under the Planned Community (PC) Zone, which designates specific properties for heavy commercial, light industrial and residential uses. Although utilities are available and access to both interstate and railroad is good, a considerable amount of undeveloped property remains. Development constraints include floodplain areas affecting some properties and poor soils resulting in constraints with onsite wastewater disposal. There are two private water companies in the community, both of which are drawing from deep wells. The Bellemont Area Plan was adopted by the Board of Supervisors on July 1, 1985. The Regional Plan has identified a Rural Growth Boundary within this Area Plan as well as the potential for a Rural Activity Center. Because of significant development in the Bellemont area since the creation of the Area Plan, this area is a high priority for an update.

DONEY PARK, TIMBERLINE, & FERNWOOD: The Doney Park/Timberline/Fernwood area is the largest unincorporated community in the County and consists of about 60 square miles located northeast of Flagstaff extending from Camp Townsend at the southwest corner to Lenox Park at the north end and east to Winona. About 30 percent is privately owned, with the remainder under Forest Service jurisdiction. The predominant land use is large lot residential, with about 60 percent of the parcels being 2 ½ acres. Neighborhood commercial areas are located at a few of the major intersections. Growth has been fairly rapid and complete build-out of the area at zoned densities has nearly occurred and will result in a population of about 15,000. The Board of Supervisors adopted a County Area Plan and design review guidelines for the area in 2001, which was an update of a previous plan adopted in 1988. The intent of the Area Plan is to retain the large lot rural character and predominantly residential land uses. The Regional Plan has identified a Rural Growth Boundary within this Area Plan as well as the potential for as many as four (4) Rural Activity Centers.

FORT VALLEY HIGHWAY 180 SCENIC CORRIDOR: The Fort Valley Highway 180 Scenic Corridor area extends from the Flagstaff city limits on Fort Valley Road out to Kendrick Park, excepting Hart Prairie. There are three non-contiguous areas of development: South Fort Valley, Fort Valley and Kendrick Park. This plan is one of the most recently updated plans, having been adopted in 2011. Route 180 is one of the most scenic corridors in the County offering spectacular views from both directions of the San Francisco Peaks. The area is not fully built out and has potential for continued development. Maintaining the rural character and pristine environment are significant priorities for residents and current zoning in most of the area is for 2-acre parcels. The plan includes Design Review Overlay Guidelines for commercial and industrial development. Fort Valley is one of the few areas of the county where most residents have their own well, and a

concern about aquifer viability was one factor leading to the desire for low density development. The Regional Plan has identified a Rural Growth Boundary within this Area Plan as well as the potential for a Rural Activity Center.

KACHINA VILLAGE: Kachina Village is located on the west side of Interstate 17 approximately six miles south of Flagstaff. Originally intended as a vacation home community in 1965, Kachina Village has evolved into a suburb of Flagstaff primarily occupied by full time residents. According to the 2010 Census, there were 2,622 residents and 1,376 dwelling units in the Village. Recreational facilities include Raymond County Park and Pumphouse Greenway. Kachina Village is nearly built-out with the exception of a handful of lots and a 36-acre parcel of undeveloped subdivision. Forest Highlands Unit Five includes an 18-hole golf course and vacation homes in an exclusive gated community with very few full time residents. A County Area Plan and Design Review Overlay for Kachina Village were originally adopted in 1997 and updated in 2008. The Regional Plan has identified a Rural Growth Boundary within this Area Plan as well as the potential for a Rural Activity Center.

MOUNTAINAIRE: The Mountainaire area includes land east of Interstate 17 and south of the City of Flagstaff. This area is limited to five private inholdings within the National Forest including the Mountainaire subdivision consisting of 140 acres under medium density residential zoning, and surrounding properties under large lot rural residential zoning. Within this area the 2010 Census reported 556 housing units and a total population of 1,119. This area originally consisted of summer homes and has more recently converted to a year round community due to close proximity to Flagstaff. There have been problems with inadequate septic systems, water shortages and adverse road conditions. A few parcels with commercial zoning have yet to be developed. A County Area Plan and Design Review Overlay guidelines for the Mountainaire Community were adopted by the Board of Supervisors on December 16, 1991. The Regional Plan has identified a Rural Growth Boundary within this Area Plan as well as the potential for a Rural Activity Center.

OAK CREEK CANYON: The Oak Creek Canyon area includes both sides of Highway 89A from the corporate limits of the City of Sedona north to Pumphouse Wash south of Flagstaff. This area represents one of the few riparian habitats in the County and the Oak Creek Canyon Area Plan focuses on preservation of this precious resource. Oak Creek is designated a "unique water of exceptional circumstance" by the State of Arizona. Highway 89A has been designated by ADOT as an Arizona Scenic Roadway. There are a wide variety of housing types, property development standards, and commercial development in the Canyon. However, there is a recent trend of tearing down the older, smaller cabins to build new, larger houses that are changing the historic character of the Canyon. Occupants tend to live in the Canyon on a seasonal basis although year round inhabitants are becoming more common. Commercial uses vary from resorts and motels to restaurants, convenience stores, arts and crafts shops, as well as a trout farm. The Area Plan includes policies for development and redevelopment that address floodplains, slopes, and impervious surfaces. The Plan was amended in 1989 to address redevelopment and emphasizes maintaining the historic and environmental qualities inherent in the Canyon, while limiting human impact. The County has worked with the Forest Service in identifying private parcels in the Canyon which would be suitable for exchange for National Forest lands. A County Area Plan and Design Review Overlay for the Oak Creek Canyon were adopted by the Board of Supervisors on February 6, 1984 and amended in 1989.

PARKS: The Parks area encompasses 265 square miles north and south of I-40 between Bellemont and Williams. Of the total area, approximately 30 square miles is private land, approximately one square mile is State Trust land, and the remainder is national forest. The 30 square miles of private land consists of widely scattered sections intermixed with national forest land. The community of Parks sits roughly at the center of the planning area, but residents tend to identify more with their immediate neighborhood community, such as Government Prairie, Spring Valley, Elk Springs, Pittman Valley, Maine Townsite, and Garland Prairie. Early settlement was primarily related to ranching and farming, and a distinctly rural character and Ranchette – Rural Residential development remain hallmarks. Water is scarce, occasionally occurring in springs and shallow aquifers in a few locations, but effectively out of reach in the deep regional aquifer characteristic of most of the area. The County Area Plan was completed and adopted for the Parks area on September 17, 2001.

RED LAKE: The Red Lake area extends north 14 miles from the Williams city limits. Highway 64 bisects the area with boundaries extending five to six miles to the east and west encompassing about 40,000 acres of private land within a 150 square mile area. The Highway 64 corridor provides views of surrounding mountains including Bill Williams, Kendrick, Sitgreaves, and the San Francisco Peaks. The area was historically used for ranching activities. Several residential subdivisions were platted in the 1960s and early 1970s, and the area is primarily zoned for 10 acre minimum parcel size. Water is one of the major factors affecting future growth in the Red Lake area, as there is no local water source. Highway 64 is the primary travel route to the South Rim of the Grand Canyon and has some potential for scenic highway status. Thus the visual character of development along this corridor is of critical concern. A County Area Plan for the Red Lake Community was adopted by the Board of Supervisors on September 21, 1992.

VALLE: The Valle area extends from the Red Lake Area Plan boundary at Howard Lake north to the Kaibab National Forest boundary, and approximately 7 miles west and 8 miles east of Highway 64. The Valle area is sparsely populated in relation to the total land area of approximately 300 square miles. The only commercially developed area is in the vicinity of the junction of Highway 180 and 64 and businesses rely primarily on tourists traveling to the Grand Canyon. For this reason this *Comprehensive Plan* identifies Valle as a potential Gateway Community. Although the area is very sparsely populated, there are over 8,000 platted subdivision lots within Valle as a result of subdivisions created in the 1960s and 1970s. Growth has been limited by a lack of utility services such as phone, water, and electric, and by essential commercial services. Outside of Grand Canyon subdivision, most private land is zoned 10 acre minimum parcel size. A County Area Plan for the Valle Community was adopted by the Board of Supervisors on October 18, 1999. Residents of the area have been considering significant changes to the area and may wish to undertake an Area Plan update in the near future.

Unincorporated Communities – without Area Plans

The following identified unincorporated communities within the County do not have Board of Supervisors adopted Area Plans nor are they within the boundaries of the Regional Plan. Therefore, any future development in these areas should be limited to the existing zoning and/or conditional use permitting process. Zone changes to more intense land uses will typically not be recommended until and unless an Area Plan is adopted by the County Board of Supervisors.

ALPINE RANCHOS: This community is located approximately 15 miles northeast of Flagstaff between Doney Park and the Navajo Reservation. The area is a checkerboard of State Trust lands and private 40-acre parcels, some of which have been split into 20-acre or 10-acre parcels. This community is separated from the Doney Park community by Forest Service land and is categorized as very remote, Ranchette Residential with limited utility infrastructure available. Alpine Ranchos represents an area of the county like many others where residents have a sense of camaraderie in their desire to be left alone.

BLUE RIDGE, HAPPY JACK & CLINTS WELL: This area includes three place names but has been more recently categorized as the Blue Ridge area stemming from the Blue Ridge Ranger District. Blue Ridge is located in the southeastern portion of the county, and is accessible via Lake Mary Road/Forest Highway 3 and Highway 87. Residential subdivisions in the area date back to 1963, including Clear Creek Pines, Starlight Pines, Blue Ridge Estates, Pine Canyon Estates, Tamarron Pines, and Mogollon Ranch. The earlier subdivisions allowed both manufactured and site built homes, however, newer subdivisions allow only site built homes and require design review approval by home-owner's associations. Commercial uses are extremely limited and are oriented towards tourists traveling in the area. Additional development in this area is severely restricted by National Forest.

GRAY MOUNTAIN: This area is located approximately 40 miles north of Flagstaff along Highway 89. Historical uses in the area are tourist-oriented including a hotel, restaurant, curio shop, and convenience market with gas sales. As of 2002, a cellular tower has also been located in the area. Surrounding areas include private ranchland and State Trust land with the Navajo Reservation to the north.

GREENEHAVEN: Greenehaven consists of 491 acres bordered on the north by the Arizona-Utah state line. The area is located on the western side of Lake Powell. Development of this community began in 1980 with a rezoning to Planned Community and creation of a master plan for a mixed use community encompassing resort, residential, commercial, and light industrial uses. Originally State Trust land, the area is now entirely surrounded by Glen Canyon National Recreation Area lands. Since the initial master plan was submitted, areas have been subdivided for single family homes, condominiums, and commercial uses. Single family homes are the most prevalent form of development. Attached town homes have recently been built and the commercial areas have seen only development of a convenience market with gas sales and a boat storage facility. Potential for exchanges for State Trust land could increase the availability of developable land in the area though the planned community is almost built out.

FOREST LAKES: The Forest Lakes area consists of the 11-unit Forest Lakes Estates subdivision located in the southeast corner of the county in the area once known as Mertzville. The subdivision has 975 lots platted between 1965 and 1970, with a majority of the subdivision under one acre minimum residential zoning and commercially-zoned properties along Highway 160. Commercial uses in the area include RV parks, a restaurant, a convenience store and gas station, and rental cabins oriented to recreational activities. Historically, the area consisted of travel trailers and modest site-built cabins for summer use by Phoenix area residents.

KAIBAB ESTATES WEST: This area is located in the western portion of the county approximately 50 miles west of Flagstaff off Interstate 40 and just north of the community of Ash Fork, which is located in Yavapai County. Development consists of a

12,000-acre ranch that was divided into 1-acre to 5-acre parcels in the 1960s. The area was zoned and planned for areas of commercial, multi-family, and rural residential though development has not occurred as planned. There is little to no commercial development, other than a few stone yards that operate quarries outside of the subdivision, and a few cottage industries including feed sales. Many of the commercial and multi-family zoned parcels have been rezoned to agricultural residential. The subdivision does provide some electric and phone utilities, roads are cindered, onsite septic systems are used, and water must be hauled from nearby Ash Fork.

MORMON LAKE: Large portions of the land in this area are impacted by floodplain and wetland requirements. The Mormon Lake area consists of a limited private land base surrounded entirely by National Forest Service lands. Uses in the area include a lodge/restaurant, trailer park, summer cabins and residential uses, youth camp, and other recreational uses. Subdivisions in the area date back to 1927 when the Mormon Lake Townsite was platted. An Area Plan was initiated in conjunction with the Coconino National Forest in 1997 for the Mormon Lake community but it was never completed due to concerns of area property owners.

MUNDS PARK: The Munds Park community is located approximately 15 miles south of Flagstaff on both sides on Interstate 17. There is a mix of housing types including areas designated for manufactured housing and areas set aside for site-built and modular homes. These residential subdivisions were created around a golf course within the pines and surrounded by national forests. A commercial corridor runs through the community along Pinewood Boulevard on the east side of the interstate and includes a motel, gas stations, post office, realty offices, restaurant, and plant nursery. Along the west side of the highway separated from residential subdivisions by I-17 are an RV park, church, restaurant, and gas station.

TUBA CITY & CAMERON: Tuba City and Cameron are unique communities because they contain small private inholdings with historic trading posts on the Navajo Nation. The Cameron trading post still exists where it was constructed in the early 1900s after construction of a suspension bridge across the Little Colorado River. The total inholding includes just over 100 acres of land. Today the site includes the original trading post plus a lodge, RV park, restaurant, post office and gift shop. For this reason this *Comprehensive Plan* identifies Cameron as a potential Gateway Community. Tuba City, located in the westernmost portion of the Navajo Nation near the junction of State Highways 264 and 160 was originally settled by Mormons. In 1903 it was discovered that the town site was built on Indian land and the government bought all improvements except for an 80-acre parcel of land. This private land has since been subdivided into the Babbitt's Moenave Center. Several uses occur within this subdivision including a mobile home park, offices, motel and restaurant, service commercial uses, and a large community park.

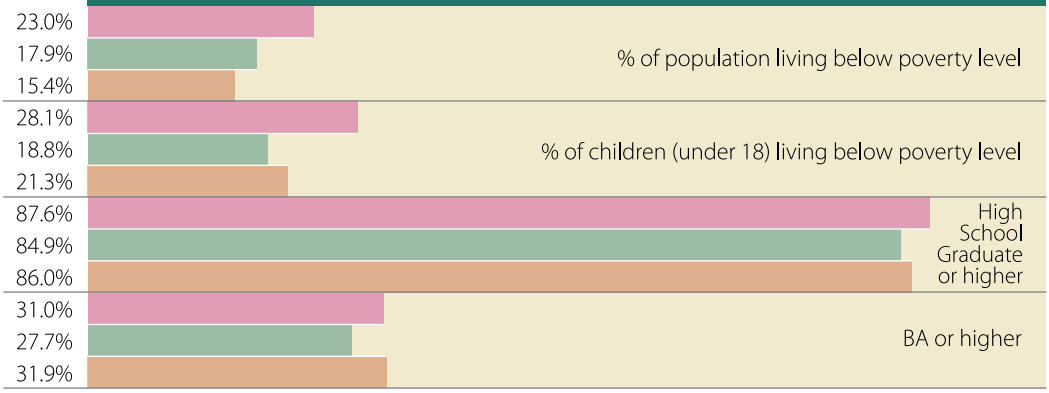
WINSLOW WEST: There are two developments in this area situated near the west end of the City of Winslow. The first is Hopi Hills subdivision, which was created in the late 1960s early 1970s. The subdivision abuts the Coconino and Navajo County line south of I-40 approximately one mile from the City of Winslow and consists of 58 acres of land divided into 235 lots averaging 7,000 square feet. Only one unit of the proposed two-unit subdivision was approved due to the requirement that roads be constructed prior to submittal of final plat. The second development includes Turquoise Ranch which consists of 40-acre parcels located near Interstate 40 and Highway 99 about 7 miles west of Winslow and about 50 miles east of Flagstaff.

VERMILION CLIFFS, MARBLE CANYON, CLIFF DWELLERS & BADGER CREEK: These areas are located on the Arizona Strip approximately 120 miles north of Flagstaff at the edge of the Vermilion Cliffs National Monument. All four sites are accessed via Highway 89A which is also a designated scenic route and an important viewshed recognized by the County. Marble Canyon includes 173 acres surrounded by lands managed by the National Park Service and Bureau of Land Management. Only a small portion is developed with a motel, restaurant, trading post, post office, gas station, air strip, and employee residences. Vermilion Cliffs is where Lee's Ferry Lodge is located which is developed with a lodge, restaurant, fishing supply and jewelry/metal art store and employee housing. Badger Creek is located adjacent to Vermilion Cliffs and encompasses 38 acres of land split into 27 parcels ranging in size from one to three acres primarily developed with residential single family homes, and a commercial warehouse used for a local river outfitter. Cliff Dwellers includes a lodge, restaurant, fly shop, gas sales, employee housing, and a river company warehouse All four communities are located at the base of the Vermilion Cliffs, which are part of the Paria Canyon-Vermilion Cliffs Wilderness. Additional development is severely restricted in the wilderness. These communities also are adjacent to Vermilion Cliffs National Monument. Bureau of Land Management administered lands south of Highway 89A near these communities are outside wilderness and national monument where development may occur, provided it complies with Federal and state law and county requirements.

TWIN ARROWS & GLITTERING MOUNTAIN: Development of the Twin Arrows Casino on Navajo Nation lands near 1-40 is having a considerable impact on land uses of adjacent fee land in Coconino County. A proposal for a multi-phase development at Glittering Mountain has been approved and the need for an Area Plan to guide continued development in this area has been identified. For both the Twin Arrows and Glittering Mountain developments the County does not provide water or fire service.

Appendix B

Coconino County Economic Statistics



Median Household Income	$49,555	Coconino County
	$49,774	Arizona
	$53,046	United States

Source: U.S. Census Bureau, 2009-2013 5-Year Amercian Community Survey

Coconino County Population Density

	2010 Population	Land Area square miles	Population per square mile
Arizona	6,392,017	113,594	56.3
Coconino County	134,421	18,619	7.2
Flagstaff	65,870	64	1029.2
Fredonia	1,314	7	187.7
Page	7,247	17	426.3
Sedona	2,842	6	473.7
Williams	3,023	43	70.3
All Unincorporated Areas in Coconino County	53,567	18,482	2.9

Source: U.S. Census Bureau

FLAGSTAFF AREA COMPARED WITH THE BALANCE OF COCONINO COUNTY

Flagstaff Regional Planning Area	84,000	525	160
Flagstaff Regional Planning area outside City of Flagstaff boundary	18,000	461	39
Coconino County outside Flagstaff Regional Plannning Area	50,421	18,094	2.8

Source: Flagstaff Regional Plan 2030 and Flagstaff Area Regional Land Use and Transportation Plan 2001

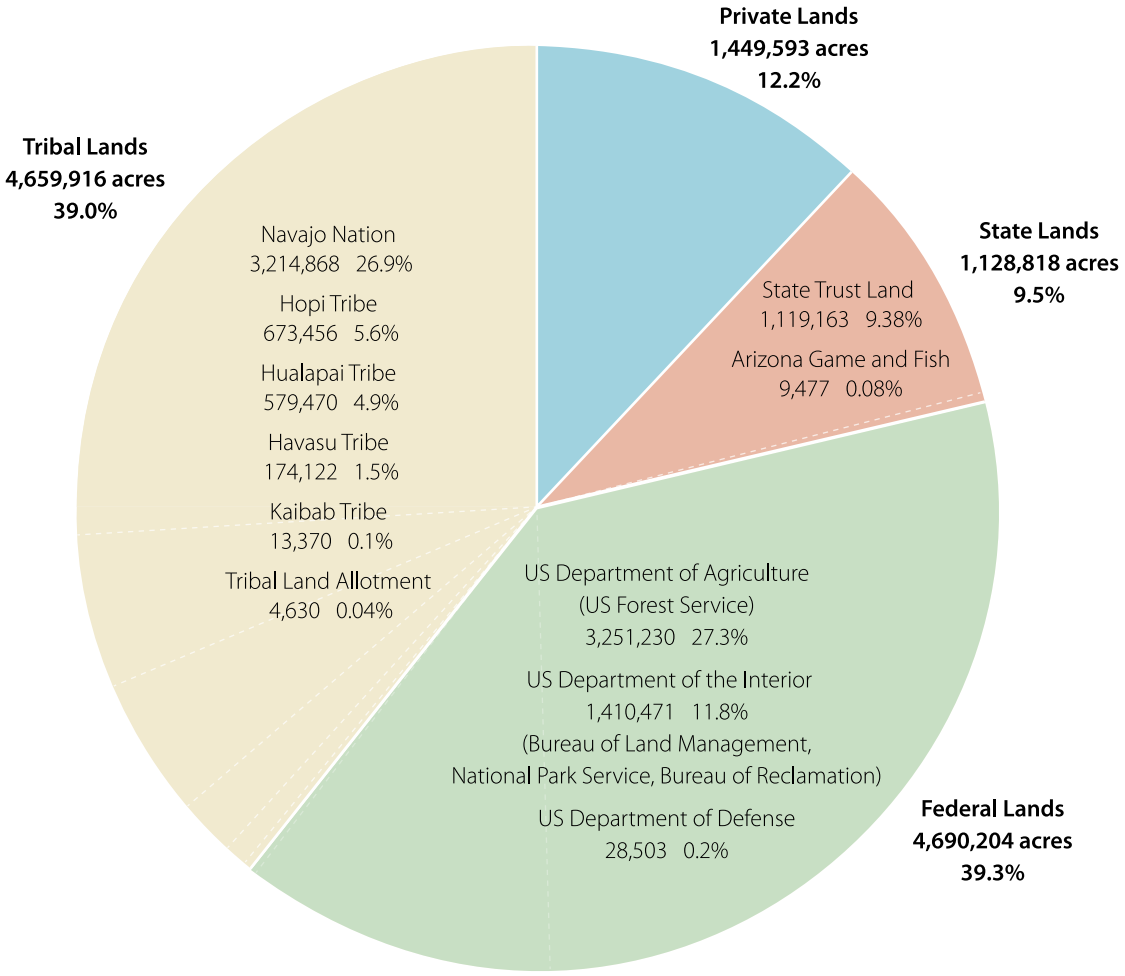
Coconino County Population Projections

	Census	2010	2015	2020	2030	Projected Population Growth Percentage 2015 - 30
Coconino County		**134,421**	**137,903**	**144,320**	**154,380**	**11.9%**
INCORPORATED PLACES						
Flagstaff		65,870	69,119	74,053	81,994	18.6%
Fredonia		1,314	1,307	1,307	1,307	0.0%
Page		7,247	7,483	7,738	8,110	8.4%
Sedona (within Coconino County)		2,842	2,857	2,953	3,144	10.0%
Tusayan		558	550	550	550	0.0%
Williams		3,023	3,020	3,076	3,142	4.0%
Unincorporated Balance of County		53,567	53,567	54,643	56,243	5.0%
CENSUS DESIGNATED PLACES (CDP) (CENSUS 2010 POPULATION > 500)						
Cameron		885	885	903	928	4.9%
Doney Park		5,395	5,396	5,506	5,659	4.9%
Fort Valley		779	779	792	817	4.9%
Grand Canyon Village		2,004	1,996	2,018	2,062	3.3%
Kachina Village		2,622	2,622	2,676	2,750	4.9%
Kabito		1,522	1,522	1,553	1,596	4.9%
LeChee		1,443	1,443	1,473	1,514	4.9%
Leupp		951	951	971	997	4.8%
Moenkopi		964	964	984	1,011	4.9%
Mountainaire		1,119	1,119	1,142	1,174	4.9%
Munds Park		631	631	644	662	4.9%
Parks		1,188	1,188	1,213	1,246	4.9%
Tonalea		549	549	560	576	4.9%
Tuba City		8,611	8,612	8,789	9,032	4.9%
Valle		832	832	849	873	4.9%
Census Designated Places denote areas with boundaries established by the U.S. Census Bureau. The CDP boundaries do not necessarily correspond with locally established boundaries						
TRIBAL LANDS						
Havasupai Reservation		465	466	471	479	2.8%
Hopi Reservation and Off-Reservation Trust Land (within Coconino County)		1,145	1,145	1,169	1,201	4.9%
Hualapai Reservation and Off-Reservation Trust Land (within Coconino County)		6	6	6	6	0.0%
Kaibab Reservation		0	0	0	0	0.0%
Navajo Nation Reservation and Off-Reservation Trust Land (within Coconino County)		23,411	23,414	23,895	24,555	4.9%
Non-Reservation Balance of Coconino County		109,394	112,871	118,779	128,139	13.5%

Source: Arizona State Demographer's Office; 2013-2050 Sub-County Population Projections

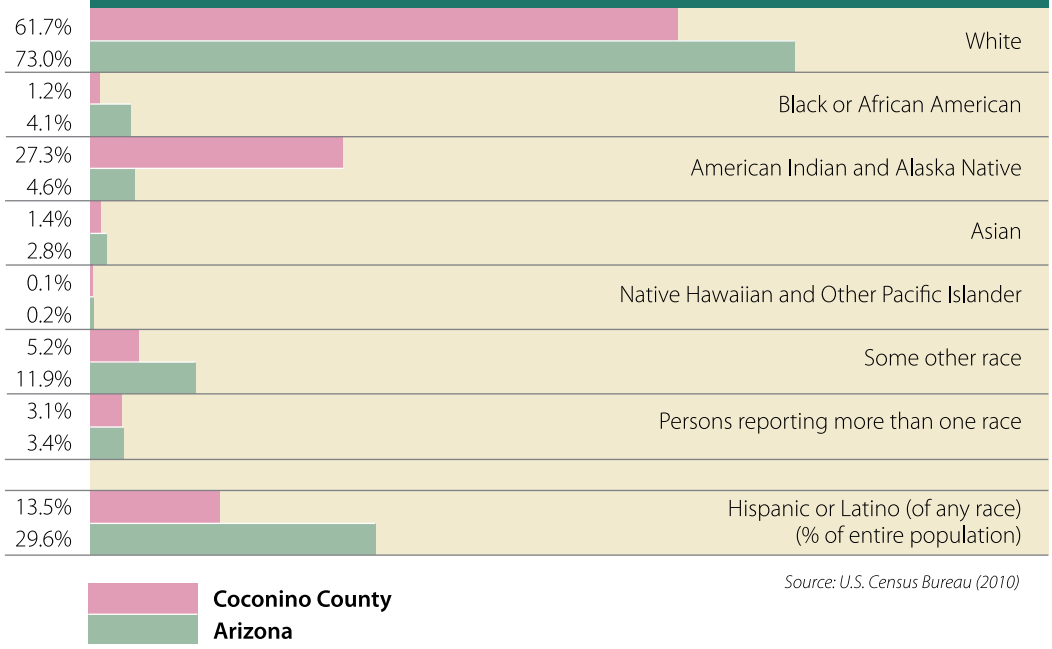
Land Ownership in Coconino County

Measured in acreage and percentage of total land in the county



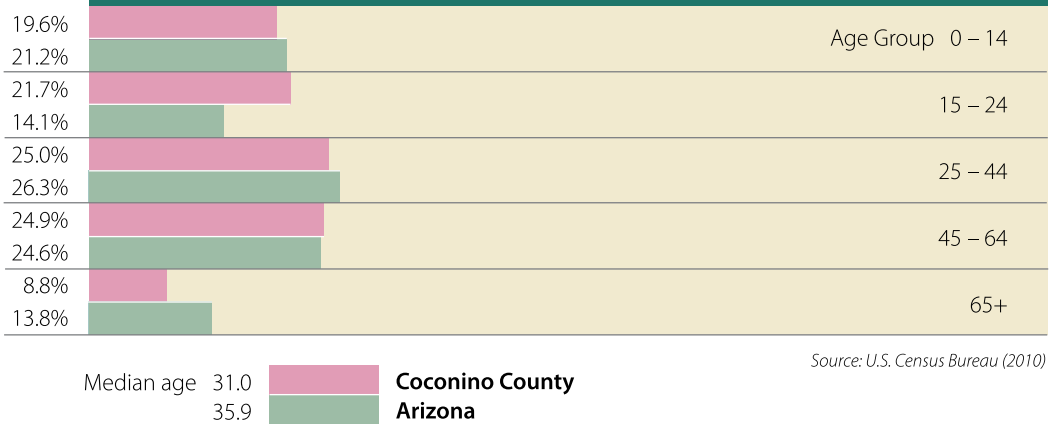
Source: Coconino County GIS

Coconino County Race and Ethnicity



Source: U.S. Census Bureau (2010)

Coconino County Age

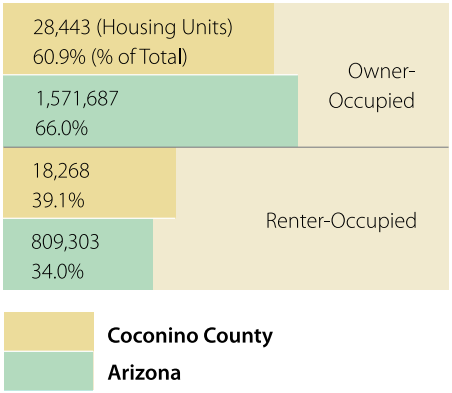


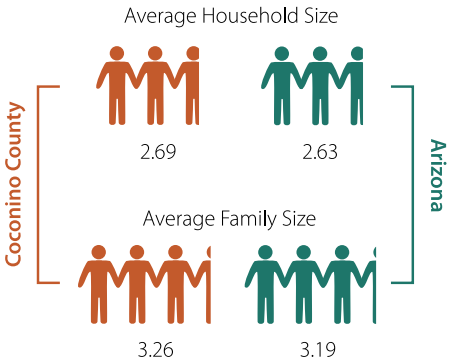
Source: U.S. Census Bureau (2010)

Housing Statistics

	Coconino County	% of Total	Arizona	% of Total
Total Housing Units	63,321		2,844,526	
Occupied Housing Units	46,711	73.8%	2,380,990	83.7%
Vacant Housing Units	16,610	26.2%	463,536	16.3%
For seasonal, recreational or occasional use	12,057	19.0%	184,327	6.5%

(Note: seasonal units are a component of vacant housing units)



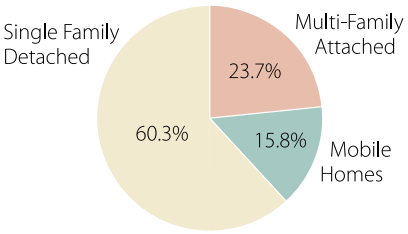


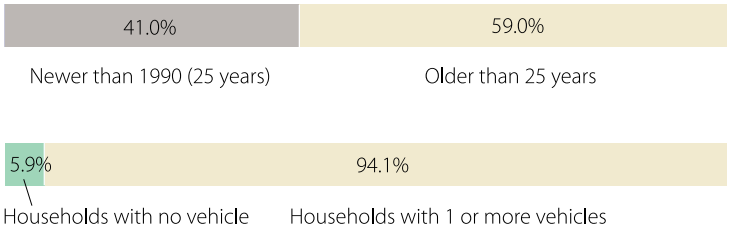
	Coconino County	% of Total	Arizona	% of Total
Family Households	29,656	63.5%	1,576,520	66.2%
Nonfamily Households	17,055	36.5%	804,470	33.8%

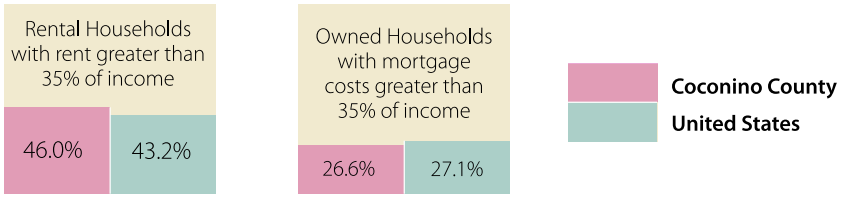
(Note: A family household is a group of two people or more related by birth, marriage or adoption and residing together)

Source for this chart and above: US Census Bureau (2010)

OTHER HOUSING STATISTICS OF INTEREST IN COCONINO COUNTY







Source: American Community Survey; 2013 - 5 year estimate
Note: all housing statistics are for the entirety of Coconino County - including incorporated areas

Appendix C

WATER RESOURCES APPENDIX

The following table and maps provide additional information about the location of significant water features, surface and ground water sources, and the amount of water used by communities and other entities in the Region. Information was collected, displayed and generously provided by the Coconino Plateau Watershed Partnership's Technical Advisory Committee in 2015 (www.cpwac.org).

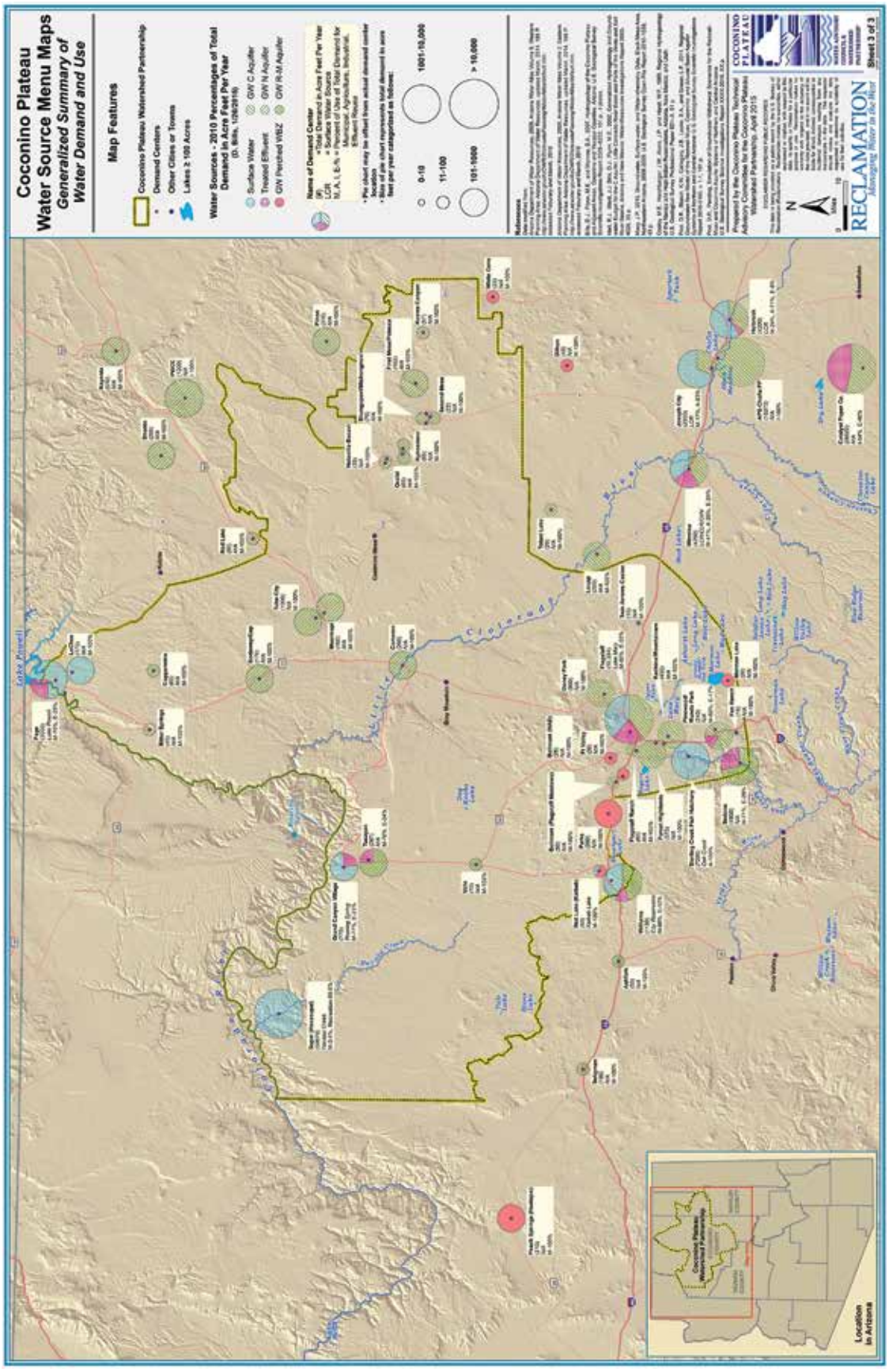
Regional Water Use by Community/User (acre feet per year; 2010 Data)

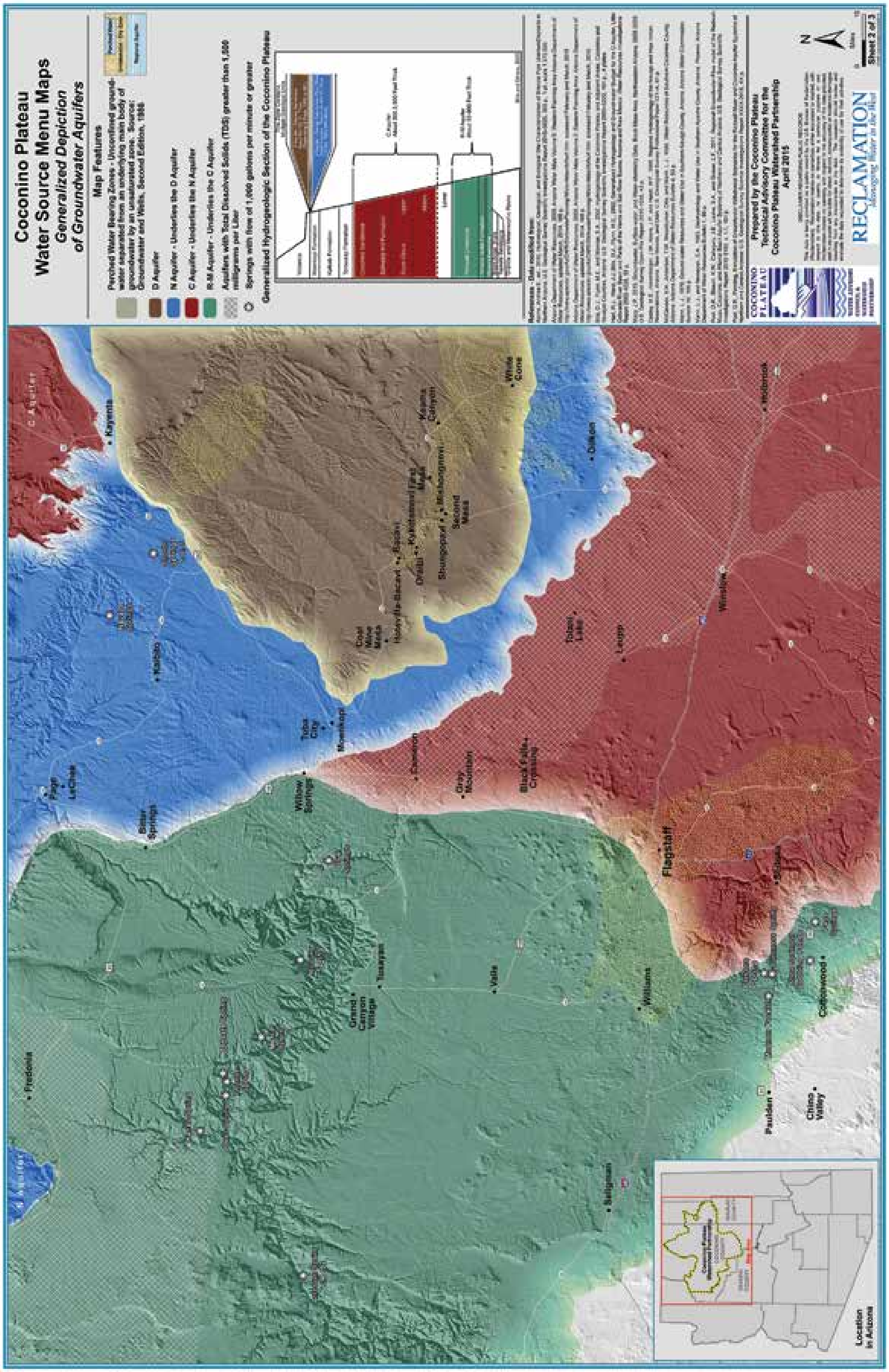
Water User	Total water use (AF/yr)	Surface water use and source	Surface water purpose	Reclaimed effluent use	Ground water use & source	Ground water use; Municipal	Ground water use; Industrial	Ground water use; Agricultural
APS-Cholla PP	15373				15373 (C)		15373	
Ashfork	44				44 (RM)	44		
Bellmont (Flagstaff Meadows)	44				44 (C)	44		
Bellmont (NAD)	25				25 (PZ)	25		
Bitter Springs	40					40		
Bodaway/Gap	170					170		
Cameron	200					200		
Catalyst Paper Co.	26000			12000	14000 (C)		14000	
Copper Mine	65					65		
Dilkon	40				40 (PZ)	40		
Doney Park	800				800 (C)	800		
First Mesa/Polacca	162					162		
Flagstaff	10384	3989 (Lake Mary)	Municipal	2031	4165 (C), 199 (PZ)	4364		
Flagstaff Ranch	60				60 (C)	60		
Forest Highlands	575				575 (C)	575		
Fox Ranch	10				10 (C)	10		
Ft Valley	20				20 (PZ)	20		
Grand Canyon Village	775	600 (Roaring Spring)	Municipal	175				
Holbrook	4200	2500 (LCR)	Agricultural	200	1500 (C)	1000		500
Hotevilla-Bacavi	35				35 (N)	35		
Joseph City	2900	2000 (LCR)	Agricultural		900 (C)	500		400
Kachina/Mountainare	450				450 (C)	450		
Kayenta	510				510 (N)	510		
Keams Canyon	57				57 (N)	57		
Kykosmovi	65				65 (N)	65		
LeChee	175	175	Municipal					
Leupp	200				200 (C)	200		

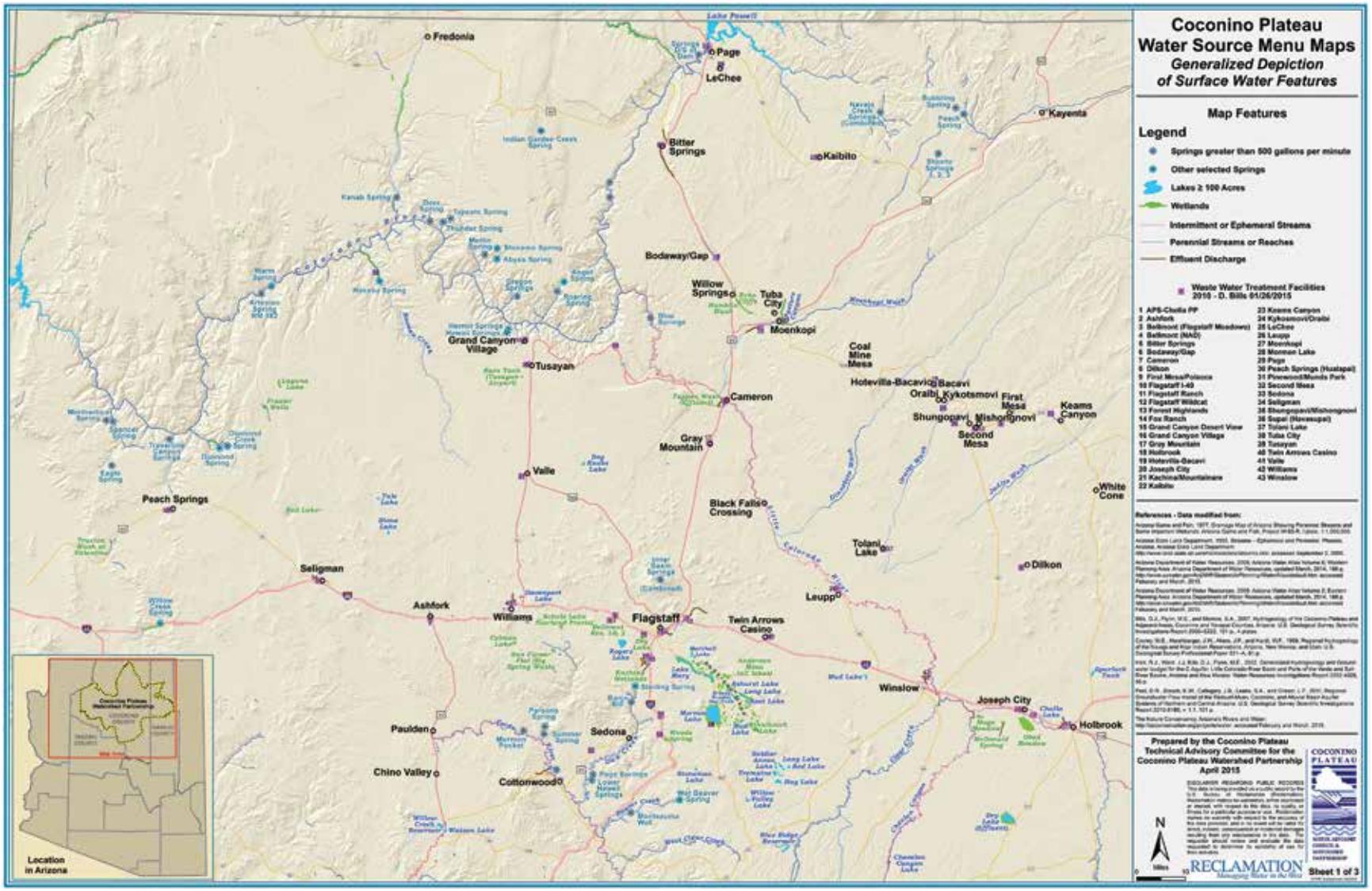
Moenkopi	160				160 (N)	160		
Mormon Lake	20				20 (PZ)	20		
Oraibi	65				65 (N)	65		
Page	3000	2250 (Lake Powell)	Municipal	750				
Parks	200				200 (PZ)	200		
Peach Springs (Hualapai)	210				210 (PZ)	210		
Pinewood/Munds Park	240			40	200 (C)	200		
Pinon	310				310 (N)	310		
PWCC	1200				1200 (N)		1200	
Red Lake	44				44 (N)	44		
Red Lake (Kaibab)	80	30 (Kaibab Lake)	Municipal		44 (PZ)	44		
Second Mesa	22				22 (N)	22		
Sedona	4900			1400	3500 (RM)	3500		
Seligman	100				100 (RM)	100		
Shonto	200				200 (N)	200		
Shungopavi/Mishongnovi	70				70 (N)	70		
Sterling Creek Fish Hatchery	7250	7250 (Oak Cr.)	Agricultural					
Supai (Havasupai)	50870	50700 (Havasu Cr.)	Agricultural		170 (RM)	170		
Tolani Lake	20				20 (PZ)	20		
Tuba City	1000				1000 (N)	1000		
Tusayan	287			70	217 (RM)	217		
Twin Arrows Casino	10				10 (C)	10		
Valle	70				70 (RM)	70		
White Cone	20				20 (PZ)	20		
Williams	1130	500 (Reservoirs)	Municipal	130	500 (RM)	500		
Winslow	4250	1500 (LCR, CLR, CHV)	Agricultural	1000	1750 (C)	1750		

Abbreviations:

LCR = Little Colorado River	CLR = Clear Creek	CHV = Chevelon Creek	C = C Aquifer	N = N Aquifer	RM = R-M Aquifer	PZ = Perched water-bearing zone


Coconino Plateau
Water Source Menu Maps
Generalized Summary of
Water Demand and Use
Map Features
Coconino Plateau Watershed Partnership
Demand Centers
Other Cities or Towns
Lakes ≥ 100 Acres
Water Sources - 2010 Percentages of Total Demand in Acre Feet Per Year
(D. Bills, 12/8/2015)
Surface Water
Treated Effluent
GW Perched WBZ
GW C Aquifer
GW N Aquifer
GW R-M Aquifer
Name of Demand Center
(P) = Total Demand in Acre Feet Per Year
LCR = Surface Water Source
M, A, I, & N = Percentage of Total Demand for Municipal, Agriculture, Industrial, Effluent Reuse
• Pie chart may be offset from actual demand center location
• Size of pie chart represents total demand in acre feet per year categorized as follows:
0-10
11-100
101-1000
1001-10,000
> 10,000
Submission
Prepared for the Coconino Plateau Technical Advisory Committee for the Coconino Plateau Watershed Partnership, April 2015
COCONINO PLATEAU
RECLAMATION
Managing Water in the West
Sheet 3 of 3
Location in Arizona
Lake Powell
Grand Canyon Village
Williams
Flagstaff
Sedona
Cottonwood
Camp Verde
Prescott
Prescott Valley
Chino Valley
Ash Fork
Seligman
Peach Springs (Hualapai)
Tusayan
Valle
Parks
Bellemont
Munds Park
Kachina Village
Mountainaire
Happy Jack
Forest Lakes
Pinetop-Lakeside
Show Low
Snowflake
Taylor
Winslow
Holbrook
Joseph City
Heber-Overgaard
Payson
Star Valley
Pine
Strawberry
Tonto Basin
Rim Country
Young
Globe
Miami
Superior
Kearny
Hayden
Winkelman
San Carlos Reservation
Peridot
Safford
Thatcher
Pima
Fort Thomas
Eden
Duncan
Clifton
Morenci
Metcalf
Greenlee County
Apache County
Navajo County
Gila County
Yavapai County
Coconino County
Graham County
Coconino Plateau Watershed Partnership


Coconino Plateau
Water Source Menu Maps
Generalized Depiction
of Groundwater Aquifers
Map Features
D Aquifer
N Aquifer - Underlies the D Aquifer
C Aquifer - Underlies the N Aquifer
R-M Aquifer - Underlies the C Aquifer
Generalized Hydrogeologic Section of the Coconino Plateau
Prepared by the Coconino Plateau
Technical Advisory Committee for the
Coconino Plateau Watershed Partnership
April 2015
RECLAMATION
Sheet 2 of 3
Location
in Arizona
Flagstaff
Williams
Page
Winslow
Cottonwood


Coconino Plateau
Water Source Menu Maps
Generalized Depiction
of Surface Water Features
Map Features
Legend
Springs greater than 500 gallons per minute
Other selected Springs
Lakes ≥ 100 Acres
Wetlands
Intermittent or Ephemeral Streams
Perennial Streams or Reaches
Effluent Discharge
Waste Water Treatment Facilities
2010 - D. Bills 01/26/2015
1 APS-Chulla PP
2 Ashfork
3 Belmont (Flagstaff Meadows)
4 Belmont (NAU)
5 Bitter Springs
6 Bodaway/Gap
7 Cameron
8 Dilkon
9 First Mesa/Polacca
10 Flagstaff I-40
11 Flagstaff Ranch
12 Flagstaff Wildcat
13 Forest Highlands
14 Fox Ranch
15 Grand Canyon Desert View
16 Grand Canyon Village
17 Gray Mountain
18 Holbrook
19 Hotevilla-Bacavi
20 Joseph City
21 Kachina/Mountainaire
22 Kaibito
23 Keams Canyon
24 Kykotsmovi/Orabi
25 LeChee
26 Leupp
27 Moenkopi
28 Monnan Lake
29 Page
30 Peach Springs (Hualapai)
31 Pinewood/Munds Park
32 Second Mesa
33 Sedona
34 Seligman
35 Shungopavi/Mishongnovi
36 Supai (Havasupai)
37 Tolani Lake
38 Tuba City
39 Tusayan
40 Twin Arrows Casino
41 Valle
42 Williams
43 Winslow
References - Data modified from:
Prepared by the Coconino Plateau
Technical Advisory Committee for the
Coconino Plateau Watershed Partnership
April 2015
Sheet 1 of 3
Location
in Arizona
Fredonia
Page
LeChee
Kayenta
Bitter
Springs
Kaibito
Bodaway/Gap
Willow
Springs
Tuba
City
Moenkopi
Grand Canyon
Village
Tusayan
Coal
Mine
Mesa
Hotevilla-Bacavi
Bacavi
Oraibi
Kykotsmovi
First
Mesa
Keams
Canyon
Shungopavi
Mishongnovi
Second
Mesa
Cameron
Gray
Mountain
Valle
White
Cone
Peach Springs
Black Falls
Crossing
Tolani
Lake
Dilkon
Seligman
Leupp
Ashfork
Williams
Flagstaff
Twin Arrows
Casino
Winslow
Joseph City
Holbrook
Paulden
Sedona
Chino Valley
Cottonwood
N
Miles
RECLAMATION
Managing Water in the West

Appendix D

Coconino County Comprehensive Plan ENERGY ELEMENT
Approved by the Board of Supervisors
July 10, 2012

INTRODUCTION

Reliable, clean energy is critical to the health, safety and welfare of residents in Coconino County. It affects the availability of potable water, economic development and the general way of life. The County has a responsibility to be a leader in innovative and responsible energy management while creating a secure and clean energy portfolio. Worldwide, a number of concurrent factors have contributed to a strong interest in increasing energy efficiency and the development of renewable energy. These include:

- The increasing cost of oil and other energy sources
- The decline in the availability of nonrenewable resources
- The potential for economic growth through the expansion of green jobs
- The conservation of water, including through the energy-water nexus
- Concerns about the effects of human-caused climate change

The energy-water nexus refers to the fact that the production of energy requires large volumes of water while the treatment and distribution of water is equally dependent upon readily available, low-cost energy.

Another factor is the ability to avoid other negative effects of fossil fuel and uranium extraction and energy generation such as:

- Smog and declining air quality
- Respiratory ailments and other health impacts
- The release of toxins such as mercury and other greenhouse gases
- Water and ground pollution
- Impacts to wildlife and ecosystems
- The management and storage of toxic and radioactive materials, including locally mined ore

Locally, there has been an increase in interest in developing renewable energy projects as well. Permits for residential wind and solar installations have become a regular occurrence and, as of 2011, utility-scale wind and solar energy projects have been approved through Conditional Use Permits. These requests have identified complicated tradeoffs regarding the need for clean, renewable energy projects and their effects on viewsheds, neighbors, wildlife, vegetation, natural quiet and the land.

This Energy Element also articulates the goals of the Coconino County Sustainable Building Program that works to promote energy conservation and efficiency in new and existing buildings. This Element promotes the development of locally produced and

used, renewable energy projects by establishing County policies that provide guidance for the expansion of renewable energy while avoiding, minimizing and mitigating negative impacts.

THE CONSERVATION FRAMEWORK RELATIONSHIP

The goals and policies of this Element consider all five ecological principles and eleven conservation guidelines defined in the Conservation Framework. This Element is specifically tied to Conservation Guideline G, conserving the use of non-renewable and critical resources, which calls for the conservation of resources such as water and reduction of our reliance on nonrenewable resources such as oil, coal and petroleum. Decisions about energy projects are also influenced by Guidelines A, C, and E. Guideline A calls for the assessment of impacts to be considered in a landscape context. Guideline C addresses the avoidance or mitigation of human use on ecological processes and the landscape. Guideline E speaks to minimizing the fragmentation of large contiguous areas of wildlife habitat.

OUR VISION & PURPOSE

Our County vision supports growth while protecting natural resources. This Element establishes policies that emphasize the value of our distinctive natural landscapes and promote the conservation of natural resources while encouraging development of sustainable buildings and renewable energy sources. As growth continues, we envision using creative approaches to ensure the efficient use of energy, and to create a diverse, renewable and clean energy portfolio. Energy goals and polices related to transportation can be found within the Circulation Element.

CURRENT ENERGY PICTURE

In the decade from 2000 to 2010 Coconino County's population grew by 16%[1]. That growth along with an increase in per capita energy consumption is increasing demand on energy providers. In 2009, Arizona ranked 46th amongst the 50 states in energy consumption per capita and 24th for total energy consumption. Arizona's primary energy sources in 2008 were petroleum (30%), coal (25%), natural gas (22%), nuclear (17%) and renewable (6%). Renewables include hydropower, wood, solar, geothermal and combustion of waste materials. Energy consumption by use in Arizona in 2009 was 34% for transportation, 28% for residential purposes, 24% for commercial, and 14% for industrial according to the Southwest Energy Efficiency Project[2].

Traditional energy sources make up the majority of energy generation in Coconino County. Traditional energy includes fossil fuel powered electricity generation such as natural gas and coal power as well as nuclear power. Significant environmental concerns exist in relation to traditional energy development. These concerns range from health impacts such as the emission of mercury and the effects of microscopic particles on respiratory systems to the global climate- altering effects of greenhouse gases.

The majority of electricity generated in Coconino County comes from coal. The coal supply is mined in open pits by Peabody Coal on the Navajo and Hopi Reservations and in New Mexico. The coal is then burned to create energy, providing inexpensive and reliable power. Navajo Generating Station, NGS, outside of Page produces 2,250 MW of energy and is one of the largest coal plants in the country. The plant supplies energy to

[1]U.S. Bureau of the Census. 2010. Profile of General Population and Housing Characteristics
[2]Southwest Energy Efficiency Project. 2011. Arizona Energy Fact Sheet: Energy Efficiency and Energy Consumption. www.swenergy.org

Arizona, New Mexico, and California, and is the energy source for pumping water in the Central Arizona Project. According to Salt River Project, the utility responsible for operating NGS, the Kayenta mine and NGS together employ 1,000 people. Navajo Generating Station faces several big issues in the next decade as its lease expires in 2019 and the EPA is requiring additional technology to clean up haze-related pollution that could cost in excess of $1 billion dollars.

Significant federal investment has been allocated to assist in "clean coal" technologies, which are designed to make the large-scale burning of coal more efficient and reduce pollution including but not limited to carbon dioxide, sulfur dioxide and nitrogen oxides. The effectiveness of these technologies is still being researched. However, small-scale carbon off-setting, through the planting of biomass, can be an effective approach to balancing an individual's carbon output because plants act as natural air filters. Green roofs and increasing native vegetation are common examples. The choice of biomass should be carefully considered to manage invasive species and water usage.

Natural gas is an expanding energy sector that is applauded for having less of an environmental impact than other fossil fuels. However, hydraulic fracturing or "fracking," a method by which gas is extracted using chemicals to create fractures in subsurface rock layers, has recently come under scrutiny for potential water contamination and possible correlation to increased seismic activity. Fracking operations, along with natural gas, oil and coal production, are considered mineral extraction and are currently exempt from County oversight.

Nuclear power is another traditional energy source. While some consider nuclear power to be a clean energy source due to its lack of emissions, it has other environmental impacts related to the mining and processing of uranium, as well as the disposal of depleted nuclear fuel. Although there are no nuclear power plants in Coconino County, there are uranium mines and mining claims near the Grand Canyon. The federal government has placed a 20-year moratorium on new uranium mining claims near the Grand Canyon, however it does not affect proven, existing claims or continued development of 11 uranium mines. Counties have no jurisdiction over mining operations larger than five acres. Nonetheless, issues related to uranium mining have impacts on areas of high importance to Coconino County. They include impacts to water supplies and long-term health issues such as have occurred on the Navajo Nation. Protection of Coconino County's water resources is a high priority as outlined in the Water Resources Element of the Comprehensive Plan. Protecting the health and safety of citizens is a primary concern as well.

Land disturbance is the alteration of the natural landscape including grading and impacts to vegetation and soils.

Other impacts of traditional energy use are financial and environmental costs as resources diminish. Additionally, any new facility would have impacts to wildlife, water resources, viewsheds, air quality, and would have land disturbance. Rising energy costs affect all aspects of the cost of living including transportation, housing and food. The steady increase in population and use of energy- driven technology in Arizona, as well as nationally and internationally, will continue to increase demand for energy, placing greater pressure on natural resources to meet future energy demands if significant investment is not put into renewable resources.

GOAL:

Increase the use of technologies and strategies to reduce pollution, environmental degradation, and negative health impacts associated with energy sources.

POLICIES:

1. The County supports the use of available, proven technologies that eliminate or minimize negative human and environmental impacts for power production facilities. Conservation Guidelines, H, I

2. The County supports technologies and procedures that protect air quality and visibility, viewsheds, public health, and the conservation of water. Conservation Guidelines: C, G, H, I

3. The County will promote the development of small-scale carbon-off-setting techniques through the Sustainable Building Program. Conservation Guidelines: B, C, I

ENERGY CONSERVATION AND EFFICIENCY

Reducing energy consumption involves both energy conservation — the idea of doing with less or doing without, and energy efficiency — the idea of getting more out of less by employing technologies that perform while using fewer resources.

Reducing energy consumption has environmental, economic and social benefits. Lowering energy consumption can reduce environmental impacts such as wildlife, vegetation and land disturbance, as well as air and water pollution. Because most of the energy generated in Coconino County is from fossil fuels, reducing energy consumption would also reduce nitrogen oxide, sulfur dioxide, mercury and carbon dioxide emissions, and significantly reduce water use. Economically, reducing energy use saves money and minimizes the effects of utility rate increases. Increasing energy conservation through behavior change is the most affordable and therefore immediately achievable energy policy. Social benefits include gains to health and wellness related to clean air and water. These two concepts, energy conservation and energy efficiency, present viable opportunities for residents and businesses to reduce their overall energy consumption.

Energy conservation means reducing demand through changes in behavior. Actions as simple as turning off the lights, driving less, riding a bike, and installing programmable thermostats are all energy conservation strategies. While these changes may seem minor, if every household in the county adopted such strategies, the reduction in energy could be as large as removing 80,000 vehicles from the road for a single year according to EPA Clean Energy Resources.

There are regulatory measures that guide conservation and efficiency. Public electric utility companies regulated by the Arizona Corporation Commission are required to develop Demand Side Management programs that promote energy efficiency and are required to achieve annual energy savings of at least 22% by 2020. Gas utilities will be required to achieve an annual energy savings of at least 6% by 2020. To encourage energy efficiency in new construction, Coconino County adopted the 2006 International Energy Conservation Code that set new standards for insulation, air sealing and energy efficient windows. The County is working towards adopting the 2012 IECC which will increase efficiency by 30% over the 2006 codes.

Other efforts are done on a voluntary basis. Many of Coconino County's builders have embraced building to the ENERGY STAR standard. Individual owners and builders have participated in the County's Sustainable Building Program and utilize the County's checklist to achieve a Sustainable Building Award. This can increase the value and marketability of a home or business while saving a considerable amount in energy costs over the life of a building.

The County has implemented a number of no-cost programs to encourage residents and small businesses to pursue energy efficient technologies as well as make green building more financially attractive. These services include consultation, plan review, educational

resources, code and field support, marketing, publicity and awards as well as educational programs, workshops and events. There are a number of other incentives the County hopes to implement pending future resources, including reduced fees on permits, secured loan support for energy efficient and renewable energy residential projects, energy efficiency and renewable energy rebates.

Low-cost building techniques can significantly reduce a building's energy consumption. One technique is passive solar design which encompasses the efficient siting and orientation of buildings to provide optimal southern exposure, and the use of glass on the south side of buildings with eave overhangs that provide winter sun into the building and summer shading. Thermal mass is used to store the solar heat generated. The quality of insulation also affects the efficiency buildings. Other aspects of passive solar design include thermal blinds, energy efficient glazing, day lighting, ventilation and the use of vegetation for shading techniques. Typically, passive solar measures do not add considerably to the overall cost of building and incidental costs are quickly recovered through energy savings. Coconino Community College and the Sustainable Building Program both provide a number of courses and training opportunities on energy efficient construction methods.

Substantial energy savings can also be achieved through retrofitting existing buildings. Major overhauls as well as small changes can make an impact. Energy audits can identify inefficient energy usage and recommend cost-effective means to improve building performance. Both electric and natural gas utilities have instituted such programs. The County Sustainable Building Program has partnered with other agencies to provide basic weatherization services to County residents and will continue to pursue funding opportunities for such programs.

Reducing energy consumption is a high priority for the County because it will reduce demand on existing infrastructure, save money and reduce the need for new infrastructure and its associated impacts.

GOAL:

Reduce energy consumption by increasing energy conservation and efficiency.

POLICIES:

1. Coconino County shall be a leader in reducing energy consumption, and shall strive for buildings to be energy self-sufficient.

2. In order to increase awareness of opportunities for citizen action, the County shall continue educational programs for energy conservation and efficiency through the Sustainable Building Program and coordination with educational institutions. The County shall also support educational opportunities for workforce programs, job training, and employment opportunities such as the Energy Efficiency Conservation Corp. Conservation Guidelines: I

3. Proposed subdivisions, commercial, industrial, multifamily residential and public and semi-public uses shall consult with the Sustainable Building Program prior to review by the Planning & Zoning Commission and Board of Supervisors. The review will include consultation on site location, project

layout for maximum solar gain, building design, energy efficiency and conservation of resources. Conservation Guidelines: A, B, C, G, I

4. The County shall support, foster and adopt building efficiency programs and energy standards that reduce per capita consumption. Programs include the International Energy Conservation Code, building weatherization projects, national programs such as ENERGY STAR and LEED and local programs such as County Sustainable Building Program and the Regional Network for Energy and Water Sustainability. Conservation Guidelines: G, H, I

5. The use of Energy Star and/or other energy efficiency standards and technologies is strongly encouraged for all buildings. Conservation Guidelines: G, I

6. The County shall be a model of sustainable design and energy efficiency in the construction of new County buildings and renovations. Conservation Guidelines: B, C, G

7. The County encourages energy conservation that is economically feasible in both new and remodel construction through the development of incentive programs and support for incremental retrofits. Conservation Guidelines: G, I

8. The County will assist residents of all income levels to identify achievable strategies that reduce energy consumption. Conservation Guidelines: G

9. The reduction of energy consumption is encouraged through the conservation of water including establishing an assured 100 year water supply and water catchment for all buildings

CREATING ENERGY GENERATION

While working to reduce energy consumption is the most effective goal for the County, additional energy generating sources will be needed to meet the current and future growth in demand. Clean and renewable energy technologies are a rapidly growing segment of the energy sector. These sources contribute to a sustainable future for all communities by creating energy independence and security through diversification and local energy production. In January 2011, The President called for producing 80% of energy from clean sources by the year 2035 and a national Renewable Energy Standard is under consideration. In 2006, the Arizona Corporation Commission adopted the Renewable Energy Standard and Tariff requiring all regulated utilities to generate 15% of their electricity from renewable resources by 2025, up from 6% in 2008. The use of alternative energy sources within Coconino County has been expanding due to the effects of these policies and the availability of more than 300 days of sunshine and moderate wind resources. The County supports new generation from clean, renewable sources.

Two major systems of renewable energy generation are distributed and utility-scale production. Distributed energy is the generation of electricity in small amounts in lots of places. For example, residents and businesses putting photovoltaic panels on their rooftops, wind turbines on their property and ground source heat pumps in their yards. Utility-scale energy generation is defined as the production of energy with the intent of producing power in excess of 120% of the energy used for on-site consumption such as

the Perrin Wind Farm and the Cromer Elementary School portion of the APS Community Power Project. These projects tend to have more significant impacts on surrounding communities and the natural environment than distributed energy systems.

Net-energy generating buildings will be an important part of future development. These building generate more energy than they use by combining conservation and efficiency measures with on- site power production. They can supply nearby developments with their excess power to help limit the needs of expanding electric grid infrastructure and associated impacts.

Renewable energy technologies are evolving at a rapid pace. New strategies for reducing impacts to the natural environment, wildlife, viewsheds, natural quiet and land disturbances are being developed. Industry and its technologies are ever changing and it is critical to ensure the best practices of the day are being implemented.

DISTRIBUTED ENERGY SYSTEMS

The number of distributed wind and solar energy systems county-wide has grown because photovoltaic technology is rapidly becoming more efficient and more affordable due to an increase in incentives from utility companies and tax benefits. Prior to that, the most common use of alternative energy had been the incorporation of solar and wind technologies on remote properties that were not connected to the existing electrical grid. Today, frequently used systems consist of wind turbines and photovoltaic solar arrays that generate no more than 3-4 kilowatts, about the amount of energy used at a single family residence. They can be used to provide primary power or by utility customers to reduce the amount of electric power that needs to be purchased.

One example of a distributed, utility-owned project is the solar array at Cromer Elementary School. There, 1560 panels produce 871 kW of energy (1000 kilowatts is equal to 1 Megawatt of energy).

Distributed systems can also be owned by a utility company. In 2010, Arizona Public Service initiated the Community Power Project in the Doney Park area to conduct a study of the impacts of many distributed systems on the grid. The project includes the installation of utility-owned photovoltaic systems on single family dwelling rooftops. While the solar panels are located on individual residences, APS remains the owner. These homeowners have granted easements to APS in exchange for a fixed rate on their energy bills for twenty years.

Putting solar panels on rooftops is permitted under currents codes, requiring only a building permit. An Accessory Wind Energy Ordinance was approved by the Board of Supervisors in 2008. The Ordinance permits turbines meeting height requirements of the underlying zoning and requires a Conditional Use Permit for turbines that exceed zoning height limits or for the placement of more than three turbines on a property. For any distributed energy system that is beyond an accessory use of the site, and intends to create more energy than can be used on the property, a Conditional Use Permit will be required to mitigate potential impacts. This was the case for a portion of the Community Power Project located at Cromer Elementary School that would generate more power than used on-site.

Accessory Wind is a system designed as a secondary use to existing buildings or facilities, wherein the power generated is used primarily for on-site consumption

Regulatory issues can arise regarding “rights to light”. This is the potential of neighboring properties to be developed in a way that places shadows across one’s property, limiting the effectiveness of solar power technologies. One way to resolve some of these challenges is to have solar easements granted by neighbors ensuring that defined areas will not contain any light blocking obstructions. While more than 30 states have solar easement provisions, Arizona does not. The subdivision process can help ensure that properties are designed to maximize solar potential of each site.

Other distributed energy technologies include solar water heaters and ground source heat exchange pumps (also called geoexchange systems). Solar water heaters reduce energy demand, resulting in as much as a 25% cost savings over electrically heated water systems alone. As of 2011, there has been an increase in the number of permits issued for such systems. Small-scale geoexchange energy extraction is possible for buildings through the use of ground source heat pumps. These use the constant earth temperature at shallow depths for home heating and cooling. This process requires digging onsite trenches which can be laid under landscaping or parking lots. In 2011, the first residential geoexchange energy project in the Coconino County was completed.

Distributed energy systems can minimize the impacts of transmission lines and land disturbance by making use of existing transmission and already disturbed lands. This reduces impacts to wildlife and other natural resources as well as disperses the impacts of energy generation across the community.

GOAL:

Utilize wind and solar resources by encouraging distributed energy systems.

POLICIES:

1. The County will review codes and ordinances on a regular basis to assure adaptability to changing technology in distributed energy systems.

2. Distributed energy systems located at the point of use and on disturbed lands near existing substations and transmission are encouraged because they reduce the amount of infrastructure and land disturbance required for energy generation. Conservation Guidelines: C, E

3. The County will continue to explore and facilitate the installation of distributed energy systems for homeowners and small businesses.

4. Protection of solar access and site plans that maximize the potential for distributed solar will be considered in the design and approval of new projects. Conservation Guidelines: A

5. The County will continue to monitor permitting process for distributed energy systems to make it more streamlined, affordable and predictable to customers while maintaining responsible development of such systems.

6. An energy generating system with the intent of producing energy beyond an accessory use of the site, in excess of what is typically consumed by such a use, will require a Conditional Use Permit. In review of such proposals, the goal and policies outlined in Utility-Scale Wind and Solar should be implemented as appropriate. Conservation Guidelines: B, C

7. The County will encourage job training programs and other educational opportunities to create a workforce of experts in distributed energy systems.

UTILITY-SCALE WIND AND SOLAR

The County has experienced a considerable increase in interest in utility-scale wind and solar projects. There are at least two dozen meteorological wind test towers that have

been approved and constructed in various parts of the county since the early 2000's. The 40-turbine Sunshine Wind Farm, near Meteor Crater, was approved by the Board of Supervisors in 2005 but has not been constructed as of 2012. The Perrin Wind Farm, consisting of 62 turbines, was approved in 2011 and operational as of January 2012. Utility-scale solar was approved in 2011 at Cromer Elementary School and at an APS substation in Doney Park.

Utility-scale wind and solar projects are supported by several components of the County Comprehensive Plan. They have the potential to sustain the economic viability of working ranches, to create jobs, to protect and conserve water resources, to improve air quality and human health, compliment other sustainable goals and policies of the Comprehensive Plan. While energy generation from local, clean, renewable sources is essential, there are potential negatives associated with projects.

The location of utility-scale projects can greatly alter their impact on wildlife. Utility-scale wind facilities have been associated with the direct mortality to a range of avian and bat species during breeding, wintering, and migratory phases of their life cycles. Proper siting of wind facilities and mitigation strategies, such as adjusting the speeds at which turbines are allowed to turn, can minimize impacts to wildlife. There are multiple solar energy technologies including photovoltaic and solar thermal generation, as well as mounting options that can increase effectiveness of photovoltaic panels, each of which have significantly different impacts on the landscape. Ground-mounted utility-scale solar facilities may require extensive clearing of vegetation, grading and fencing. These facilities thus have the potential to eliminate or fragment large areas of intact habitat for a range of wildlife species and to disrupt wildlife movement corridors. Utility-scale rooftop projects avoid and minimize these impacts to land and wildlife. Therefore siting of utility-scale wind and solar projects on previously disturbed lands having low value for wildlife is ideal. Given that avoidance, minimization and mitigation of such impacts is often difficult, adequate pre-construction research leading to proper siting of utility-scale solar and wind facilities is critical.

An example of mitigation is off- site habitat acquisition or restoration or financial support for relevant wildlife research.

Some utility-scale projects can have affiliated water impacts that conflict with existing goals and policies because of the potential for significant water concerns including evaporation ponds that may attract wildlife, and hydrology and water runoff concerns. Some solar technologies use steam driven turbines that require significant water resources. In general, wind energy requires little water consumption and has minimal impacts on watersheds. Due to the arid environment of the County, water intensive use is not favored.

Other impacts associated with utility-scale wind and solar include the introduction of noxious weeds, large area land disturbance, the construction of new roads and infrastructure, impacts on scenic viewsheds from tall turbines and photovoltaic panel reflectivity, and potential impacts on neighbors including noise, lighting and reduction of property values. These impacts are taken seriously in Coconino County. For example, as the Diablo Canyon Rural Planning Area Plan states, "The County has been aggressive in its attempts to protect the visual integrity of the County, with a comprehensive sign code adopted in 1981, a billboard ban in 1986 and cell tower ordinances… cell tower applicants have been encouraged to look for sites on the south side of I- 40 because the view of the peaks is on the north side."

The County also has an extensive Lighting Ordinance to protect dark skies, which are a valued natural resource. Light pollution-free dark skies are treasured by many residents,

visitors to National Parks and other county attractions and are a critical resource to the historic and growing astronomical research industry. Current ordinances protect dark skies but also have the benefit of energy conservation by requiring directed night lighting and capping lumen output. Utility- scale wind towers are subject to federal requirements regarding safety lighting for aviation. Promising new technologies in development such as radar-activated warning lighting have the potential to greatly reduce impacts to dark skies from wind turbines. Projects should minimize the impacts of these lights while meeting federal requirements.

The need for new transmission lines and substations shall be considered in project approval as well. These auxiliary facilities have similar impacts to the projects themselves such as large area land disturbance, wildlife collisions, fragmentation of habitat, disturbance of panoramic viewsheds, nighttime lights, noise and impacts on neighbors. Building fewer and shorter transmission lines and substations can considerably reduce these impacts and therefore, it is preferable for projects to be located as close as possible to existing interconnection points. In order to protect viewsheds, burying transmission lines is preferred.

From a zoning perspective, utility-scale renewable energy projects have been treated the same as public utility installations, through issuance of Conditional Use Permits in the rural zones. This process allows the placement of conditions to avoid, minimize and/or mitigate the impacts of proposed projects as a requirement of approval. It allows the establishment of criteria, standards and requirements to obtain permits, creates monitoring standards, and establish procedures for decommissioning. This approval process allows the County to evaluate factors and criteria specific to each project proposal.

Information required by the County to approve utility-scale wind and solar projects includes pre- construction data on existing wildlife conditions, inventories of historic and archeological resources, transmission availability and interconnection studies, construction-related impact mitigation such as dust, weeds, erosion and impacts on existing roadways, and plans for post- construction monitoring studies in accordance with guidelines from independent agencies and experts. Examples include U.S. Fish and Wildlife Service, AZ Game and Fish Department, and the Natural Resource Conservation Service. Depending on the project, any number of expert entities may be solicited for advice regarding water and other County resources. This information is essential for decision-making bodies to make educated choices.

Because of the potential impacts to Coconino County residents, the natural environment, and wildlife species and habitat, clear distinct benefits to the community are necessary for utility- scale project approval. These benefits can be in the form of revenue generation, economic stimulus, job creation, energy security and improved air and water quality and health impacts. The ability of developers to identify these attributes and any other benefits of proposed utility- scale projects is critical.

As outlined in Guidelines for Decision Making, individual projects shall be assessed in a landscape context, considering the effects of decisions cumulatively and over time. This process involves looking at all features of projects including transmission lines and substations as well as how different projects across landscapes interact in terms of impacts on migration corridors, scenic viewsheds and neighbors. It also considers the need for additional energy generation.

GOAL:

Develop efficient and appropriate wind and solar energy generation while avoiding and minimizing impacts to the natural environment, wildlife and community character.

POLICIES:

1. The siting of utility-scale projects and transmission lines shall consider: the protection of viewsheds, the potential for noise disturbances to adjacent residential areas, the conservation of species, habitats and water resources, the preservation of pre-historical and historical sites, the conservation of scenic corridors, and the protection of the character of public lands. Underground collection lines are strongly encouraged. Conservation Guidelines: B, C, D, E, F, G, H, I

2. The cumulative impacts of all components of projects including substations and transmission, as well as the impacts of multiple projects on a landscape, shall be a consideration in the approval process. Conservation Guidelines: A, J, K

3. The County supports the development of utility-scale projects on disturbed lands with low value to wildlife and requiring minimal alteration of native vegetation and topography, and that are as close as possible to existing transmission interconnections. Conservation Guidelines: B, C, E, G, H

4. Utility-scale energy projects that allow for continuation of traditional land uses such as ranching and hunting shall be preferred over projects that assume all use of the land. The ability to retain multiple uses of the land, including rooftop installations or agreements to keep ranches intact, is ideal.

5. Early consultation with appropriate agencies is required in order to assess existing soils and vegetative ecotypes, to develop construction mitigation practices, to create restoration and re-vegetation plans, as well as to create short and long term plans to mitigate erosion, invasive species, and loss of optimum habitat for wildlife and commercial grazing. Appropriate plans may include Conservation Plans, Habitat Restoration Plans, and Integrated Weed Management Plans.

6. Project sites that conflict with critical wildlife habitat, sensitive species, movement corridors, riparian areas and areas of significant topographic relief such as canyons and cliffs should be avoided. Pursuing projects in these areas will require extensive data collection and mitigation measures to reduce the risk of mortality, fragmentation of habitat and significant long-term displacement of wildlife. Conservation Guidelines: D

7. Early and ongoing consultation with Arizona Game and Fish Department and U.S. Fish and Wildlife Service to assess potential wildlife impacts and develop appropriate biological surveys and reports such as Avian and Bat Protection Plans, Eagle Conservation Plans, and pre-construction study plans in accordance with agency recommendations is required prior to project

approval. Project approval may require addressing concerns revealed in these reports. Conservation Guidelines: A, C, J, K

8. The County encourages utility-scale renewable energy projects that engage in innovative research and operational procedures that are consistent with current best practices and scientific knowledge. These may include the use of radar activated lighting, wildlife study designs that include off-project comparison sites, turbine curtailment during migratory periods and other practices designed to improve the understanding of, or reduce project impacts.

9. Approval of meteorological test towers is supported under guidance from Arizona Game and Fish Department and the U.S. Fish and Wildlife Service for gathering of critical information but does not imply future approval of wind turbines.

10. Available tools to mitigate impacts to adjacent residential uses, habitat, wildlife, watershed, views, dark skies and other resources, including low impact construction practices such as minimizing infrastructure foot prints, limiting grading and sensitivity to timing related to wildlife habitats, shall be implemented. Visual warning systems that utilize radar to activate aviation safety lights are preferred for all projects unless superseded by Federal regulations. Conservation Guidelines: C

11. In order to protect water supplies, projects that use less water or reclaimed water during operation shall be preferred over more water intensive systems and additional impervious surface area created by a project shall be considered in project approval. Conservation Guidelines: G, H

12. In order to balance impacts of projects on residents and the natural environment, the County prefers projects that can demonstrate significant energy benefit and local and regional benefits. Conditional Use Permit renewals will be required to demonstrate how they are specifically benefiting Coconino County. Conservation Guidelines: K

13. Decommissioning bonds or similar provisions and/or plans are considered key components of projects. Conservation Guidelines: J, K

14. Site restoration and reclamation plans shall be considered in project approval.

15. Conditional Use Permits for utility-scale projects shall include conditions with timelines to ensure that current, best practices and technologies are applied. Updating to current best practices and technologies may be required upon extension or renewal.

16. All projects shall implement and maintain extensive public communication to address public comments and community concerns in the pre-approval phase and as necessary throughout the life of the project.

17. The County will create an enduring, interdisciplinary Energy Advisory Committee (EAC) to help review and analyze development proposals and their

supporting documentation for proposed projects to provide technical support to the Planning and Zoning Commission and the Board of Supervisors. The EAC will also oversee the implementation of approved projects and conditions of approval, including the development of project-specific management plans such as Avian and Bat Protection Plans, weed management/ restoration plans, and required mitigation measures. Conservation Guidelines: A, C, J, K

18. The County will encourage legislative changes necessary to allow groups of citizens to create renewable energy special districts.

BIOMASS

Biomass fuel is a potential renewable energy source in Coconino County. Biomass includes the use of renewable materials, such as wood, plant material and agricultural wastes. On a residential scale, the most common example is burning wood or wood pellets for heat. Biomass can also be used to generate electricity either through direct combustion or gasification of biomass material.

Tree thinning to reduce fire risk and improve forest health in the ponderosa pine forests creates an opportunity for biomass energy. As of late 2011, the US Forest Services' Four Forests Restoration Initiative in northern Arizona would increase the availability of small diameter ponderosa pine trees, therefore making the supply of biomass materials more predictable for commercial projects. Current forest management practices are to burn slash piles onsite. However, if this biomass could be distributed to residents for firewood or to a utility-scale facility, there would be energy production benefits for Coconino County.

The use of excess forest and woodland material is encouraged for biomass and to create health forests. Disturbance issues related to the creation of new roads and invasive species and should be mitigated.

The collection of gases created from decomposition occurring in landfills can be an energy source. Gases are pumped to an engine which powers a generator connected to the electric grid. Benefits include reducing methane released into the atmosphere and turning a liability into an asset to be sold. As of 2012, Cinder Lakes Landfill is the only feasible location for such a facility.

The burning of trash can create energy. If not done properly, however, this can release heavy metals, toxins and other emissions with health concerns and effect air quality and viewsheds. Stringent oversight for such facilities would be required to avoid negative impacts to humans, wildlife and the environment.

Consideration of a utility-scale project requires a Conditional Use Permit. Particular concerns include air emissions, heavy use of the site and transportation of materials. Location near a residential community is discouraged unless emissions could be eliminated or adequately minimized. Because utility-scale biomass power generation will produce both emissions and require transportation of fuel, impacts on residential communities, environmental issues and other established uses must be considered and minimized. As of 2011, no utility-scale biomass processing plants exist in Coconino County.

GOAL:

Support the development of clean biomass energy.

POLICIES:

1. The development of biomass energy facilities is supported if impacts on nearby communities, wildlife, air quality and the natural environment can be avoided, minimized or mitigated. Conservation Guidelines: C, I

2. The County supports biomass energy through the distribution of forest thinning materials to residents for firewood and utility facilities.

3. Studies to demonstrate the impacts on public health and air quality are important in the approval of utility-scale biomass energy projects and should be developed in coordination with expert entities. Conservation Guidelines: C, I

4. The County shall be stringent concerning air pollution, viewsheds, clear skies, collection methods, land disturbance and emissions when considering utility-scale projects. Conservation Guidelines: G

5. The County shall encourage residents to replace existing wood stoves and fireplaces with EPA-approved units Conservation Guidelines: C, I

ADDITIONAL UTILITY-SCALE ENERGY SOURCES

Hydroelectric power is another source of energy. Glen Canyon Dam is the only hydroelectric power plant in Coconino County, with a generating capacity of 1,300 MW of electricity. While there are no air emissions, there are considerable environmental impacts to the river corridor and ecosystems both up and downstream. Micro generation in small channels is a developing technology. However, Coconino County has few perennial streams and rivers so development of any new hydroelectric plants is unlikely.

Geothermal energy utilizes the high temperatures deep within the earth as an energy source. Benefits of geothermal power include energy reliability and minimal impact on air quality, land disturbance and viewsheds. The average temperature at about four miles in depth in the county is 175 to 200 degrees Celsius, warm enough for utility-scale geothermal production. However, at this time, development is likely not economically viable because extraction is difficult due to the depth of the heat in Coconino County. However, many experts believe that Coconino County has some of the highest potential in Arizona for a utility-scale geothermal plant because of volcanic vents. Geothermal technology is rapidly evolving and funding sources are increasing the potential for a future facility.

New technologies are emerging at a rapid pace. The County is looking to weigh the benefits against the costs in regards to the positive and negative impacts on human health, wildlife, water use and quality, economic development, vegetation, erosion, noise, views, dark skies and other treasured elements of Coconino County when considering projects.

GOAL:

Diversify Coconino County's energy portfolio through the responsible expansion of additional renewable energy sources.

POLICIES:

1. The County will continue to research and support education on the various alternative energy resources and options.

2. The County encourages the use of alternative energy projects to serve off-grid communities.

3. Research and development of other alternative energy sources is encouraged as long as negative impacts to humans, wildlife and the natural environment are avoided, minimized or mitigated. Conservation Guidelines: C, I.

4. The County supports safe, clean methods of energy generation that have clear benefits to outweigh potential negative impacts.

Appendix E

COMPREHENSIVE PLAN MAP DATA SOURCES

GIS Data Sources

The maps in this Comprehensive Plan were created by Coconino County Geographic Information Systems (CCGIS) in coordination with the Coconino County Community Development Department. Most of the spatial data used to create the maps in this Plan are housed by CCGIS and periodically updated.

The datasets listed below were derived from sources outside of CCGIS

Plan Element	Map Name	Data Name	Data Source	Year Created	Additional Source Information
Natural Environment	Natural Resource Conservation	County-wide Wildlife Corridors	Arizona Game and Fish Department	2011	Arizona Game and Fish Department. 2011. The Coconino County Wildlife Connectivity Assessment: Report on Stakeholder Input.
Natural Environment	Natural Resource Conservation	Audubon Important Bird Areas	National Audubon Society	2012	Areas identified by Audubon and partners as having high bird conservation value.
Natural Environment	Natural Resource Conservation	Springs	Arizona State Land Department	1993	This data set consists of spring locations in Arizona and incorporates information extracted from both the USGS Geonames database and the USGS Digital Line Graphs (DLG)s.
Natural Environment	Natural Resource Conservation	Major Streams and Washes	Arizona Game and Fish Department	2010	Dataset contains a subset of linear hydrography (rivers and washes) for Arizona. The dataset was originally developed for the 2010 Section 7 Sportfish Stocking Consultation.
Natural Environment	Natural Resource Conservation	Water, Wetlands and Riparian	US Fish and Wildlife Service	2014	National Wetlands Inventory. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC.
Natural Environment	Vegetation Types	Land Cover	National Land Cover Database	2006	Multi-resolution Land Characteristics Consortium (MRLC.
Land Use and Growth	Aggregate Sources	Material Sources	AZ Department of Transportation	2015	Material sources in Coconino County which have previously completed the ADOT environmental analysis process.
Energy Element	Energy Infrastructure	Wind Energy Potential at 50m Height	US Dept of Energy, National Renewable Energy Laboratory	1986	Annual average wind resource potential for the state of Arizona at a 50 meter height.
Public Safety	Flood and Fire Risk	Fire Risk	Oregon Department of Forestry	2013	West Wide Wildfire Risk Assessment. Final report prepared by the Sanborn Map Company.
Public Safety	Flood and Fire Risk	Erosion Potential >30% slope	Arizona Game and Fish Department	2014	Slope map was derived from 30m resolution digital elevation model by AGFD staff.

Notes